THE MINERAL INDUSTRIES OF LATIN AMERICA AND CANADA

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Introduction

The Western Hemisphere (the Americas) includes, in order of the size of their economies, the United States, Canada, and the 40 countries of Latin America; they are covered in the Minerals Yearbook, Volume II—Domestic and Volume III—International. This area comprises a total area of 40.2 million square kilometers, which is almost 27% of the world's land (149 million square kilometers) and, in 2003, had a population of about 851 million inhabitants, which was about 14% of the world's population of more than 6.2 billion people (tables 1, 2; World Bank Group, 2004; U.S. Central Intelligence Agency, 2003a§,[1] b§;).

Canada and several Latin American countries, in particular Brazil, Chile, Mexico, Peru, and Venezuela, are endowed with a wealth of mineral resources that include ferrous and nonferrous metals, a wide variety of industrial minerals, and all forms of fossil fuels. The Americas supply mineral commodities, such as alumina, bauxite, copper, diamond, gold, iron ore, manganese, nickel, silver, tin, and zinc, and mineral fuels such as, coal, oil and gas, and uranium, to the world. For the Latin American countries, the minerals sector was a significant factor in their economies based on earning export revenues, gaining foreign exchange reserves, and offering business opportunities by way of international joint ventures and foreign direct investment (FDI) projects.

Canada, Mexico, and the United States, which were signatories of the North American Free Trade Agreement (NAFTA), composed the largest and wealthiest trading bloc in the world—420 million inhabitants and about $12 trillion of gross domestic product (GDP). NAFTA members were each other's largest trade partners. The largest trading bloc in Latin America was the Mercado Común del Sur (the Southern Common Market) (MERCOSUR) with more than 245 million people and a combined GDP of about $1.9 trillion; the full members were Argentina, Brazil, Paraguay, and Uruguay, and the associate members were Bolivia and Chile. The second largest market in Latin America was the Pacto Andino (Andean Pact) with more than 117 million inhabitants and about $750 billion of combined GDP; the members were Bolivia, Colombia, Ecuador, Peru, and Venezuela. The Mercado Común Centroamericano (Central American Common Market) (MCCA) had about 35 million people and a combined GDP of about $140 billion; the members were Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua. The Caribbean Community (CARICOM) bloc had more than 17 million people and about $131 billion of combined GDP; the members were Antigua and Barbuda, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, and Suriname (tables 1, 2; World Bank Group, 2004; International Monetary Fund, 2003§; U.S. Central Intelligence Agency, 2003b§). In 2003, Latin America's economic growth, especially that of MERCOSUR, was affected by the following factors: the volatility of the international financing market, depressed prices for mineral exports, intensification of the Argentine financial crisis, and civil unrest in Colombia and Venezuela.

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- Argentina—Dirección de Economía Minera y Desarrollo
- Barbados—Ministry of Energy and Public Utilities
- Belize—Geology and Petroleum Department
- Bolivia—Viceministerio de Minería y Metalurgia (VMM) and Asociación Nacional de Mineros Medianos (ANMM)
- Brazil—Departmento Nacional de Produção Mineral
- Canada—Natural Resources Canada
- Chile—Corporación Nacional del Cobre de Chile (CODELCO), Comisión Chilena de Cobre (COCHILCO), and Servicio Nacional de Geología y Minería (SERNAGEOMIN)
- Colombia—Unidad de Planeación Minero Energética
- Dominican Republic—Dirección General de Minería
- Ecuador—Ministerio de Energía y Minas, Dirección Nacional de Minería
- El Salvador—Dirección de Hidrocarburos y Minas
- Guatemala—Ministerio de Energía y Minas, Dirección General de Minería, and Departamento de Desarrollo Minero
- Honduras—Dirección Ejecutiva de Fomento a la Minería

[1]References that include a section mark (§) are found in the Internet References Cited section.

- Jamaica—Mines and Geology Division
- Mexico—Consejo de Recursos Minerales
- Nicaragua—Administración de Recursos Geológicos, Dirección de Minas
- Peru—Ministerio de Energía y Minas
- Trinidad and Tobago—Ministry of Energy & Energy Industries, and
- Venezuela—Dirección de Planificación y Economía Minera.

The mineral commodity outlooks in this summary chapter arise from analyst forecasts of potential production through 2009 on the basis of augmented ore reserves, planned expansions of mine capacities, and new processing facilities. Estimates for production of major mineral commodities for 2003 and beyond have been based upon assumptions that concern potential timelines for increased production and new capacity construction. Plans for development and timelines that have been included in this chapter had mostly been announced publicly by the end of 2003, and were often substantiated by bankable feasibility studies or other external verification. Projects of operating companies, consortia, and/or Governments are listed as indications of their current (2003) plans and should not be considered a USGS prognosis of presumable outcomes.

General Economic Conditions

In 2003, the Americas had a combined GDP based on purchasing power parity of $15 trillion, or almost 32% of the world's GDP of $47 trillion. From 1995 to 2003, the Americas' GDP growth averaged 4.1% per year. During the same period, population growth averaged 2.1% per year. In 2003, the GDP of the Americas grew by 3.0% compared with 2.8% in 2002. In 2003, Latin America's GDP growth slowed because of an overall slowdown in exports to its countries' major markets [the European Union (EU), Japan, and the United States] and increased annual average interest rates in the region. Inflation remained in the single digits, and currency devaluations helped moderate the slowdown in economic growth during the first half of 2003 (tables 1, 2; World Bank Group, 2004; International Monetary Fund, 2003§; Economic Commission for Latin America and the Caribbean, 2004§).

Different sectors of the Brazilian economy recorded diverse rates of annual economic growth—minerals, 3.4%; agriculture, 3.0%; services, 2.5%; and industrial, 0.6% (Banco Central do Brasil, 2004§). Brazil has become the center of an increasingly rapid process of energy integration in South America, especially with respect to the region's natural gas market. Brazil produced some natural gas but imported much more than it could produce domestically. Brazil helped some neighboring countries, like Bolivia, develop its gas fields and an export pipeline network to supply Brazil's and other neighboring countries' energy needs, such as those of Argentina. In Argentina, the network of pipelines expanded to increase direct imports of natural gas from Bolivia and exports to Chile, which imported most of its natural gas from Argentina. Brazil was also heavily involved in the development of energy networks between itself and neighboring Venezuela and with its Andean neighbors. These new energy networks have led to considerable dramatic changes in natural gas and power markets for South America because of the increase in cross-border energy investment opportunities, domestic gas consumption, and internationalization of the energy sector undergone by MERCOSUR.

The International Monetary Fund (IMF) endorsed Brazil's move to a system of inflation targets and currency devaluation to guide its monetary policy in 2003. The IMF indicated that the country could reduce its debt burden, thus helping restore confidence in the Government's economic management and creating conditions for lower interest rates and economic recovery. The Brazilian Government's strategic plan for state-owned companies, which included those remaining as part of the country's mineral industry, involved more direct sales of assets via mergers and joint ventures to the private sector and possible joint ventures with some state-owned corporations of China. This plan was designed to achieve Brazil's goals of promoting and encouraging new capital flows into the economy. Given that its economy was still in recovery in 2003, however, much of this expected capital flow was delayed. Thus, a currency devaluation and a tough fiscal austerity plan were deemed necessary to help restore confidence in the Government's economic management, which included management of the remaining state-owned mineral entities, and to create favorable conditions for lower interest rates (Banco Central do Brasil, 2004§; Economic Commission for Latin America and the Caribbean, 2004§).

Brazil will continue to be a strong economy in Latin America and one of the world's most important producers of, in order of trade value, metals, industrial minerals, and mineral fuels. Future hydroelectric and thermoelectric powerplants coming onstream during the next decade are expected to help supply Brazil's growing energy needs. After the administration introduced fiscal austerity policies, worked on reforms to the country's complex tax code, trimmed the civil service pension system, and exercised more-stringent monetary policy measures to control inflation, the Brazilian real showed signs of recovering in value toward the end of 2003. In spite of a financial crisis in Argentina, the Brazilian economy was able to post a GDP growth of 1.5% in 2003.

Canada's economic slowdown in 2001 and subsequent recovery in 2002-03 were largely affected by the recession in the United States in 2001-02. Canada's currency devaluation helped encourage the upturn in economic growth of the second half of 2002 and continue it into 2003. Canada continued to be a net exporter of, in order of trade value, metals, industrial minerals, and mineral fuels. If Canada's weakened dollar continues, then presumably this could assist exports, but it also could discourage imports of certain necessary commodities, specialized equipment, and professional expertise needed to enhance the Canadian mineral industry.

In 2003, Chile's total exports accounted for about 40% of its GDP, and copper contributed about 34% to the country's total exports. Chile has a market-oriented economy with the highest annual per capita GDP in Latin America. Per capita GDP grew by about 2.1% in 2003 and was projected to grow by about 3.1% in 2004 (table 2). Chile and the United States entered into a bilateral free trade agreement (FTA) in mid-2003, which was approved by their respective legislatures; it was to go into effect at the beginning of 2004.

In 2003, Peru's recession came to an end, and the country's economy experienced renewed growth, especially in the mineral industry. The energy, mining, and related industries continued to attract significant capital inflows from foreign investors that were expected to provide long-term benefits to the country. Such investors were required to implement an increasingly wider approach to investing in community development and environmental protection based on evolving sustainable development principles that were being adopted by the Government.

In 2003, Mexico's mineral exports were extended more to markets outside of NAFTA, such as in Asia, the EU and Latin America. December 2002 marked the 10th anniversary of the signing of NAFTA. During those 10 years, trade and investment among Canada, Mexico, and the United States grew by more than 100%, and total trilateral trade averaged $1.7 billion per day. Investment in Mexico by Canada and the United States and bilateral trade between Mexico and the other two members of NAFTA continued to increase in 2003. Looking forward from the beginning of 2004, these three countries will be seriously engaged in the effort to forge a free trade agreement of the Americas (FTAA) (Wilson International Center, 2003§).

Investment Data and Political Risk

In 2003, average investment flows were at similar low levels compared with those of 2002 across most nonfuel mineral projects in Latin America and Canada. Toward the end of 2003, however, domestic and foreign investment began to recover from low investment since the late 1990s for many Latin American countries and Canada in spite of ongoing uncertainty. Higher prices for major mineral exports were a probable cause, as discussed in the country chapters in the 2003 Minerals Yearbook.

Investment opportunities for U.S. and foreign companies in Latin America increased between 1990 and 2003 because of the liberalization of the Pacto Andeno and the MERCOSUR countries' economies and privatization efforts within many Latin American infrastructure, mineral, oil and gas, and utilities sectors. Privatization and FDI were changing the industrial operating mode in many countries to a privately owned/state-regulated regime from a state-owned/state-operated regime. The establishment of joint ventures, such as in construction and management of infrastructure, energy and mining projects, and deregulated industries (gas, electricity, telecommunications), was a common practice in the region. By 2003 throughout Latin America, investors were allowed 100% of the mineral industry equity ownership, as a result of privatization or by direct acquisition processes, profits were allowed to be repatriated, and more importantly, restrictions on foreign investments were removed. These changes and the growing awareness of environmental protection also led to the establishment of increasingly effective environmental regulations and controls (EERCs) for all Latin American industries.

In 2003, the Governments of Latin American and Caribbean countries encouraged privatization and FDI to achieve more economic growth. Privatization, however, has historically resulted in lower employment and not achieved as great a level of global competitiveness and higher productivity as expected. The compromises required from labor have often appeared not to have been sufficiently rewarded or the rewards have appeared to have been redistributed mostly outside of the region. The lure of rights to private ownership of major parts of the mineral endowment in Latin American countries, such as Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Jamaica, Mexico, Peru, Suriname, and Trinidad and Tobago, attracted great interest in 2003. A special case was Cuba where the Government increasingly allowed foreign companies to participate in prospecting and exploring, production of raw mineral commodities, and refining of metals and crude oil, in the interest of obtaining sources of hard currency for its economy.

In 2003, FDI inflows to the Latin American and Caribbean region amounted to about $36.5 billion, which was almost 19% lower than that of 2002 ($45.0 billion). The decrease of FDI inflows varied across countries owing mostly to differences in country-specific risk characteristics, including political risk. FDI in the region as a whole was completing a cyclical downturn that lagged only slightly behind a cyclical low in 2002 for international prices of most of the mineral resources that are found in abundance in many of these countries. In Mexico and the Caribbean Basin (Central America and the Caribbean), capital inflows have been more stable. Average annual FDI more than doubled, on average, between 1995 and 1999 ($15.4 billion) compared with between 1990 and 1994 ($6.8 billion) but then remained at about $15.5 billion through 2003. This was in spite of the annual average prices achieving historical lows for the nonfuel mineral commodities with which the countries of this region are most recognizably well-endowed. One reason may be the prevalence of production and processing of mineral fuels in this region, which experienced significant price increases in 2003 (Economic Commission for Latin America and the Caribbean, 2004§).

In contrast, South America's FDI inflows were more responsive to the price fluctuations of major nonfuel mineral commodities through 2003, although mineral fuels were also a very important component of production for the economies of many South American countries. Annual FDI increased fivefold, on average, during the same historical period to $45.5 billion from $8.9 billion but then declined to less than one-half of that level in 2003 ($21.5 billion). In the subregion, inflows to the Andean Community where more of the mineral industries rely proportionally more on the production of mineral fuels were more stable than those of Chile and MERCOSUR. The mineral industry of Chile, especially, was one of the largest in South America but relied most heavily on copper, the annual average price of which fell to a historic low in 2003 (Economic Commission for Latin America and the Caribbean, 2004§).

Transnational corporations (TNCs) were very active in Latin America in recent years. In 2003, the average annual FDI level by natural resource TNCs in the region was buoyed by interest the mineral fuels sector, although investment in the production of metals and industrial minerals picked up only toward the end of the year. Significant investments in oil and natural gas projects in Latin America were made or committed by ChevronTexaco Corp., Mitsubishi Corporation, Royal Dutch Shell plc, Statoil ASA, and Total S.A. in Venezuela; Repsol YPF S.A. in Argentina; and a group led by EnCana Corporation in Ecuador. Hunt Oil Company and SUEZ-TRACTEBEL S.A. invested heavily in the Camisea natural gas project in Peru. BHP Billiton plc and Rio Tinto plc continued to invest in an expansion of the Escondida copper mine in Chile, and increases in production at the mine were expected to coincide with higher copper prices in 2004. Barrick Gold Corporation continued its major investment commitments in gold mines in Argentina and Peru, as did Meridian Gold Inc. in Peru. The Governments of these host countries expected that the expanded operations of TNCs would create more jobs and generate more tax revenues and royalties (Economic Commission for Latin America and the Caribbean, 2004§).

Investment in Argentina's mining sector rose by 36% to $220 million in 2003 compared with $162 million in 2002. Investment in exploration in 2003 totaled $80 million, which was up 33% from $60 million in 2002 (Business News Americas Ltd., 2004§). The greatest amount of investment in exploration was made in the Provinces of Catamarca and Santa Cruz, where the country's two largest gold mines are located. Argentina's total FDI inflows increased to $1.1 billion from $775 million in 2002; this was still quite a bit lower than that of 2000 when FDI totaled $10.4 billion (Economic Commission for Latin America and the Caribbean, 2004§).

Brazil's FDI inflows decreased to $10.1 billion in 2003 from $10.6 billion in 2002. Foreign investors in the banking and energy sectors, however, expressed confidence in the economic future of both Argentina and Brazil (as well as of other countries in Latin America) and planned to support continued economic growth and investments in new technology in the region well into the next decade. In the mineral industry, Latin American firms, which included Companhia Vale Rio Doce (CVRD) in Brazil, were able to continue to finance investment projects with borrowed U.S. dollars and expected to be able to meet such financial commitments through increasing export revenue in 2004 and beyond. For example, CVRD planned to invest about $6 billion in mineral project developments and acquisitions through 2007 and to continue to expand and diversify the company's exports of mineral commodities. In other Latin American countries, how much FDI can be expected to recover is unclear. In 2003, Mexico's annual FDI inflows decreased owing to currency appreciation and the moving of some production plants to Asia (Banco Central do Brasil, 2004§; Economic Commission for Latin America and the Caribbean, 2004§).

After the steel industry and many sectors of the Brazilian economy, such as energy, services, telecommunications, and transportation, were privatized, consideration turned to crude oil and natural gas opportunities. New projects in the oil and gas sectors were open to mergers and joint ventures between domestic and foreign investors. Investments in the Brazilian mining industry were expected to continue to enhance exploration and mine development activities, particularly in, in order of total value invested through 2003, iron ore, gold, copper, and emeralds. This trend should continue because several corporations were forming consortia and acquiring exploration properties, mining prospects, and permits particularly for, in order of importance, oil and gas, iron ore, gold, diamond, and base metals.

In July 2003, the Cuban Government restricted certain dollar transactions and ordered state firms to deal only in convertible pesos. This somewhat limited the 1995 legal framework, which allowed for foreign ownership in joint ventures with the Cuban Government and opened sectors of the Cuban mineral industry to FDI (in dollars). This new limit on dollar transactions was cited by foreign interests as the main reason for the reduction in the number of joint ventures and economic associations operating with foreign capital in Cuba to 342 in 2003 from 397 in 2002.

Energy, mining, telecommunications, and related industries remained the most attractive sectors of the Peruvian economy for investment. The continued capital flow from domestic and foreign investors was expected to provide long term benefits to the country. According to the Comités de Privatización of Peru, the privatization process was expected to continue to generate additional investments in every sector of the Peruvian economy, particularly in the energy and mining industries. The most significant effects of the privatization of Empresa Minera del Centro del Perú (Centromín) and Empresa Minera del Perú (Minero Perú) on the minerals and financial sectors and the thermoelectricity generation industry were expected to be realized by 2005. Foreign investments in the minerals sector, mostly in copper, gold, and oil and gas, were projected to be about $17 billion between 2003 and 2007, which would be the largest committed capital to date and would contribute significantly to the future of Peru's economic development (Ministerio de Energía y Minas, 2003, p. 10, 21-25).

Legislation

In response to stakeholders' (mining industry, communities, and Provinces/Territories) demands for incentives on mineral exploration and deposit appraisal, the Canadian Federal Government introduced the Investment Tax Credit for Exploration (ITCE) in October 2000. This 3-year 15% nonrefundable federal tax credit, which was available only to investors in refundable flow-through share (FTS) tax credits for mineral resources, and exploration and mining companies, was later extended to the end of 2004. The Prospectors and Developers Association of Canada, which was a private sector organization, and the Mining Association of Canada requested an extension of the ITCE beyond the end of 2004. If approved by the Canadian mines ministers, this new extension would be in effect until the end of 2005. The FTS investments will assist the sector in gaining new investment and stimulating minerals exploration in Canada. The Federal Government was laying a foundation for the sector by providing sound economic fundamentals, encouraging innovation and knowledge, and promoting sustainable development (Natural Resources Canada, 2003).

A bill to amend the Canadian Environmental Assessment Act was reported to have been given approval during 2003. The amendments are designed to improve the timeliness and efficiency of the federal environmental assessment process in Canada (Pay Dirt, 2003b). The Canadian Institute of Mining, Metallurgy, and Petroleum has adopted best-practice guidelines for the estimation of mineral resources and mineral reserves. Specific guidelines for all minerals are expected to be established in 2004 (Northern Miner, The, 2004). The Canadian Government has allocated an additional $7.1 million to the 3-year $10.7 million targeted to the Geoscience Initiative, which began in 2000 to survey areas in northern Canada thought to have undiscovered mineral and energy resources (Northern Miner, The, 2003a). A similar survey has been commissioned by the Ministry of Indian Affairs and Northern Development to study the growing Canadian diamond industry.

The Argentine Government is seeking to strengthen ties with potential foreign investors in the mining sector. An agreement for the exploration and mining of precious stones has been reported between the Argentine Chamber of Marble, Stone, and Granite and the Italian Chamber of Foreign Trade. The Government has reportedly made progress updating protocols on various Argentine-Chilean mining projects and was seeking a similar agreement with Bolivia. Meetings with the Venezuelan mining ministry were ongoing (Business News Americas Ltd., 2004§). Brazil has implemented new laws to regulate the export and import of diamond in accordance with the Kimberly Agreement (Bates, 2003).

The Cuban Ministry of Economic Cooperation and Investment signed a cooperation agreement with the South African Ministry of Minerals and Energy to enable the collaboration between the two countries in the electricity, energy, and mining sectors. In addition, the Cuban Government signed a memorandum of understanding (MOU) with the South African electricity utility Eskom Enterprises (Pty) Ltd. and initiated talks with the Petroleum, Oil, and Gas Corporation of South Africa regarding a possible partnership. With respect to exploration and development of petroleum reserves in Cuba, Sherrit International and Pebercan Inc. of Canada operated in Cuba under joint-venture production-sharing agreements (PSA) with the Government of Cuba in 2003.

Exploration

Although Latin America maintained its top position as a destination for proposed exploration capital, its share of the world exploration budget dropped to less than 24% in 2003 from about 26% in 2002 based on budget data compiled by Metals Economics Group (MEG). By commodity, Latin America was targeted for 24% of the world gold exploration budget and 35% of the budget for base metals. The MEG ranked, in order of highest to lowest, Brazil, Peru, Chile, and Mexico in its list of the top 10 countries for 2003 exploration; the ranking was based on proposed exploration budgets (Metals Economics Group, 2003a, b). Similarly, in its annual survey of executives from leading international mining companies, the Fraser Institute ranked the Latin American countries of Chile (1st), Brazil (5th), Peru (6th), and Mexico (10th) among the top 10 jurisdictions for mining investment appeal. In this ranking, a country's mining sector was ranked higher in terms of financial attractiveness for higher geologic potential, property values, ease of doing business, and political stability, but a country's ranking was also adjusted downward for higher investment risk characteristics, such as greater uncertainty in mining policy, labor relations, laws governing property ownership claims, and tax law. Other countries in Latin America ranked by the Fraser Institute were Argentina (23rd), Venezuela (38th), and Bolivia (44th), out of 53 jurisdictions (Fredricksen, 2003§).

In 2003, about 57% ($296 million) of the Latin American exploration budget was allocated for grassroots projects, 30% ($157 million) for late-stage projects, and 13% ($64.5 million) for mine site exploration. Latin America has attracted a higher percentage of grassroots exploration than most other regions. The average advanced-stage Latin American gold resource estimate increased to 99.5 metric tons (t) (3.2 million troy ounces) of contained gold in 2003 compared with 87.1 t (2.8 million troy ounces) of gold per deposit in 2002 and 49.8 t (1.6 million troy ounces) of gold per deposit in 2001. Gold resource estimates that were actively being developed in Latin America were reported to have increased by 2,580 t (83.1 million troy ounces) in 2003 compared with the reported 2002 resource estimates on the basis of new discoveries and an extension of existing resource estimates. The MEG reported 29 Latin American projects that contained more than 31.1 t in gold resources each (Metals Economics Group, 2003c).

The U.S. Geological Survey (USGS) collects data on the number of exploration sites. According to these USGS data, Latin American countries with the greatest exploration activity in 2003 were, in descending order by number of reported sites, Mexico, Argentina, Brazil, Chile, and Peru. Gold attracted about 66% of the total exploration activity; interest in base metals, 18%; and silver, about 10%. Investment in 2003 was primarily used to further define newly discovered resources (75%) and to conduct feasibility studies of promising deposits (13%).

CVRD approved a $72 million exploration budget, 80% of which was allocated to the search for aluminum-, copper-, gold-, iron-, and nickel-bearing deposits in Brazil. CVRD also increased its international exploration effort in 2003 (Business News Americas Ltd., 2003a§). CVRD and Antofagasta, a Chilean copper producer, formed a 3-year $6.7 million joint venture to participate in copper exploration activities in southern Peru. The South African gold producer AngloGold Limited was likewise increasing its international exploration effort. The company budgeted $16 million for exploration in Latin America, of which 46% was for Brazil; 21%, for Peru; and 14%, for Argentina (Lodder, 2003§).

If approved, Brazilian law No. 7188 would redirect up to $300 million per year from state oil profits to research and prospecting for mineral resources (Pay Dirt, 2003a). Colombia's Ministerio de Minas y Energía was developing a consolidated structure for an agency within this Mining and Energy Ministry that would oversee mining exploration (Business News Americas Ltd., 2003b§). Barrick Gold Corporation's discovery of the Alto Chicama gold deposit in Peru in 2002 led to aggressive exploration in the country. Barrick budgeted $7.3 million in 2003 for exploration at Alto Chicama, and subsequent drilling defined a reserve of 224 t (7.2 million troy ounces) of gold (Barrick Gold Corporation, 2003§).

Brazilian gold production could increase significantly in the foreseeable future as a byproduct of the growth of Brazilian copper ore production and increased interest by domestic and foreign investors in largely unexplored areas. In 2003, more than 2,500 gold occurrences, which were mostly Precambrian vein deposits and alluvial placers, were known in Brazil. The Amazon region was considered to have possibilities for major undiscovered mineral wealth in addition to the large reserves of, in order of value, iron ore, manganese, bauxite, gold, copper, and tin.

The most attractive geologic exploration targets continued to be the Cordillera and the Precambrian Guyana Shield. The Cordillera, which is the backbone of the Americas, extends through Canada, the United States, Mexico, and Central America to the Andes of South America virtually to Tierra del Fuego. The Guyana Shield comprises northwestern Brazil, southeastern Venezuela, Guyana, Suriname, and French Guiana. Investments in the regional mining industry are expected to continue to enhance exploration and mine development activities in, in order of expected value, gold, iron ore, copper, silver, nickel, and emeralds. This trend is expected to continue because several corporations were forming consortia and acquiring exploration properties, mining prospects, and permits particularly for, in order of importance, gold, silver, nickel, diamond, and base metals (table 3).

The MEG reported budgeted exploration spending in Canada for 2003 at $471 million, or more than 21% of the overall worldwide exploration budget (Metals Economics Group, 2003a). Exploration budget allocations for 2003 as reported by the Canadian Government were greatest in Ontario (about 32% of Canadian total exploration budget), Quebec (19%), Nunavut (15%), British Columbia (9%), Northwest Territories (6%), and Saskatchewan (6%). Provinces and Territories with significant 2002-03 increases included Nova Scotia (65%), the Yukon Territory (64%), Ontario (60%), and British Columbia (46%). Provinces with sizeable 2002-03 decreases include New Brunswick (70%) and Alberta (18%). Approximately 78% of the reported Canadian exploration budget was allocated for initial exploration (up to and including the first delineation of a mineral deposit). Budgets of junior companies were expected to increase to $176 million in 2003 from $136 million in 2002. The composite junior exploration company off-mine site exploration expenditure in 2003 of $157 million exceeded the composite budget of senior exploration companies by $18 million (Natural Resources Canada, 2004§).

On the basis of data compiled by the USGS, gold targets accounted for approximately 53% of reported Canadian exploration. Copper exploration accounted for 11%, and nickel exploration accounted for about 10% of Canadian activity; copper exploration was focused on British Columbia and Ontario, and nickel exploration was focused on Ontario and Quebec. Diamond exploration activity continued and accounted for about 16% of all 2003 Canadian exploration sites. Approximately 91% of these sites were considered early-stage sites, which is consistent with Government statistics that indicate junior companies were conducting much of Canadian exploration activity (Northern Miner, The, 2003b).

Canadian gold exploration activity based on the number of sites in 2003 focused primarily on Nunavut, Ontario, and Quebec; diamond exploration focused on Nunavut, Quebec, and Saskatchewan. Diamond projects, such as Victor in Ontario and Gahcho Kue and Snap Lake in the Northwest Territories, entered the development phase during 2003, which lowered overall exploration costs for diamond in the region from 2002. Drilling continued to define additional nickel-copper and platinum-group metal (PGM) resources at the McCreedy West, the Norman, and the River Valley deposits in Ontario. Drilling continued to define gold potential at Kemess North and Red Chris in British Columbia, Hope Bay and Meadowbank in Nunavut, and the Red Lake region in Ontario. Development continued at the Voisey’s Bay nickel-copper deposit in Newfoundland.

In Cuba, mining activities in 2003 were concentrated around exploration for petroleum. Sherritt International Ltd. of Canada, Petróleo Brasileiro S.A. (Petrobras) of Brazil, and Repsol-YPF S.A. (Repsol) of Spain were among the first companies to be granted exploration rights in the area.

Commodity Overview

In 2003, the mineral commodities produced in Canada, Latin America, and the United States that represent Canada and Latin America’s most valuable minerals contributed to the world’s markets. Each of the three regions’ shares of the world totals for each mineral are listed in table 4. This summary includes a review of potential developments, production, and consumption for leading mineral commodities. In the Americas, the abundant and varied mineral endowments of Latin America and Canada complement the nearby mineral resources and commodity markets of the United States. Therefore, developments in the U.S. market for these commodities are included in this overview where appropriate. The outlook tables in this summary chapter show historic and projected production trends; therefore, no indication is made about whether the data are estimated or reported, and revisions are not identified. Tables in the individual country chapters are labeled to indicate estimates and revisions.

Metals

For most base metals in 2003, the price recovery toward the end of the year spurred investment globally. The supply of metals from Latin America and Canada was expected to rebound through at least 2005 because investment will take some time to recover from low investment flows experienced since the late 1990s for the region’s metals sector; a continued dearth of machinery and skilled labor in most base metal markets was expected to last until at least 2007. Because high prices encourage investment in the research and development of many substitutes, not just in increasing capacities for producing more minerals, investment flows could be directed more toward substitutes for base metals, such as optical cable and plastics; demand for those commodities was expected to grow along with consumption of metals through at least 2010 (Rowley, 2005).

Prices for metal commodities and their substitutes were highly volatile. Price uncertainty combined with additional regional uncertainties that concerned new or revised mining laws, shifting free trade alliances, and the uncertain process of economic development in many countries could deter some investments in the base-metals sector of the economies of Latin America and could lengthen projected USGS timelines for many of the projects in development that are mentioned in the following commodity summaries. Mining and mineral processing firms that operate in Canada have higher annual labor and production costs than firms that operate in developing or emerging economies. Despite Canada’s rich endowment of raw minerals, uncertainty related to changes in policy that could affect pensions and subsidization of energy expenditures, along with the higher production and exploration costs in Canada, could delay development of some minerals projects longer than in many other mineral-rich countries, such as those in Latin America.

Aluminum and Bauxite and Alumina.—*Production.*—In 2003, about 10 countries had internationally significant production levels of bauxite, and 4 of them were in Latin America; Jamaica and Brazil were the third and fourth ranked producers in the world, respectively. Since 1990, bauxite production in Latin America has increased by about 45% to account for about 26% of world production in 2003 compared to a 23% global share in 1990 (table 4; Sehnke, 1996). This improvement was primarily due to considerable increases in production in Brazil, Jamaica, Suriname, and Venezuela during this time (table 5).

During the past 30 years, the trend in the global geographical pattern of alumina production has been away from the major metal-consuming and metal-smelting regions and toward the major bauxite-producing countries, which included Brazil and Jamaica (MacMillan, 2004). Alumina do Norte do Brasil S.A. (Alunorte), which was the leading producer of alumina in Brazil, completed an expansion of its plant in 2003 to increase the production capacity from 1.5 million metric tons per year (Mt/yr) to approximately 2.3 Mt/yr (Companhia Vale do Rio Doce, 2004, p. 8). During the 1980s and 1990s, Brazil greatly expanded its alumina production capacity, and its alumina output in 2003 was 140% greater than that of 1990. Jamaica's ongoing development of additional alumina refining capacity also continued into 2003, most notably at the Jamaica Alumina Company (Jamalco) alumina refinery where capacity was increased by 25% compared with that of 2002. Jamaica's output of alumina in 2003 was about 34% higher than in 1990. Jamaica continued to rank fifth in the world in alumina production (Sehnke, 1996; Plunkert, 2005b).

By 2003, primary aluminum metal production in Latin America still had not caught up with the region's increased bauxite production, although primary metal output had increased by 26% since 1990. For example, although bauxite production in Venezuela had increased by about 607% from 1990 through 2003, production of primary aluminum increased by less than 2% during the same time period (tables 5, 6). Production of primary aluminum in Mexico was basically brought to an end by the closure of Aluminio y Derivados de Veracruz, S.A. de C.V. in August 2003.

In Canada, the country's capacity in primary production of aluminum metal has grown rapidly since 1990, but in 2003, some production capacity was being temporarily closed because poor market conditions have imposed low profit margins since 2000. In 2003, Alcan announced that it was too costly to keep its primary smelter in Arvida, Quebec, open any longer even after a slight improvement in prices towards the end of the year. This announcement was made in spite of Alcan's ability to secure the additional power in the region that the smelter required through negotiation of a projected 22-year power-exchange project with the provincial utility Hydro-Quebec. Since 1990, the countries of Latin America and Canada have produced about 18% per year of the world's primary aluminum, but only Brazil and Canada had increased primary metal production considerably by 2003 (tables 4, 6; Plunkert, 1996). In 2003, Canada and Brazil were ranked third and sixth in the world, respectively, in terms of primary aluminum metal output (Plunkert, 2005a).

With reserves of bauxite and advanced aluminum metal production capacity, the aluminum sector in Brazil exhibited the highest degree of vertical integration among the countries of Latin America and Canada. For example, Alcoa Alumínio S.A. (a subsidiary of Alcoa Inc., Pittsburgh, Pennsylvania) mined bauxite, refined alumina, smelted aluminum metal, and fabricated numerous aluminum products in 2003 (Alcoa Inc., 2005b§). The most significant remaining obstacle to increasing Brazilian aluminum metal production further was the lack of a sufficiently consistent source of electrical power. In 2003, a power failure at Alcoa's majority-owned Alumar smelter prompted the company to warn that such uncertain electricity supply could place the company's Brazilian expansion plans in jeopardy (Alcoa Inc., 2003b§, 2004§). Owing to ongoing operational improvements implemented since 1993, CVRD and the other owners of the ALBRAS primary aluminum production facility were able to surpass an estimated production capacity level of 432,000 metric tons per year (t/yr) in 2003, but daily production at the facility often lagged behind its listed capacity prior to 2002 (ALBRAS-Alumínio Brasileiro S.A., 2005, p. 2). ALBRAS was able to produce at its listed capacity of 406,000 t/yr for the year 2002 after at least a year of energy rationing in northern Brazil (Companhia Vale do Rio Doce, 2002).

Since 1990, recycling and secondary aluminum production has increased rapidly in Brazil, Canada, and Mexico, although it still made up only about 13% of total production of aluminum metal in Latin America and Canada in 2003 (tables 6, 7). Increased installation of more-advanced recycling facilities has improved these countries' shares of global secondary aluminum metal production. In 2003, the countries of Latin America and Canada accounted for about 10% of the world's secondary production of the metal compared with about 4% in 1990; the United States accounted for about 38% of global secondary aluminum production in 2003 (World Bureau of Metal Statistics, 1995, 2004, p. 10).

Consumption.—Latin America and Canada's share of global primary aluminum consumption in 2003 amounted to about 6.4%; the United States alone accounted for about 21% (World Bureau of Metal Statistics, 2004, p. 9). Since 1990, U.S. apparent consumption of aluminum has increased by 16.5%, but U.S. imports for consumption have increased by about 37%. Especially since 2000, this increase has reflected the trend in the U.S. market for primary aluminum metal to be more dependent on imports and, therefore, even more important for the neighboring countries of Latin America and Canada. In 2003, 60% of U.S. imports of primary aluminum came from Canada; 5%, Venezuela; 2% each from Brazil and Mexico (Plunkert, 1996, 2005a).

In 2003, about 45% of U.S. imports of bauxite came from Jamaica; approximately 10%, Brazil; and 9%, Guyana. The United States imported significant quantities of alumina as well, and about 31% of U.S. alumina imports came from Suriname; 16%, Jamaica; 4%, Canada; 3%, Brazil; and a negligible amount from Venezuela (Plunkert, 2005b).

In 2003, Latin America and Canada's consumption of primary aluminum was at basically the same level as that of 2000 and amounted to about 1.8 million metric tons (Mt), of which Canada and Brazil were the dominant consumers. In 2003, the level of consumption of primary aluminum for Latin America and Canada was 57% higher than it was in 1990, mostly owing to the increased capacity to fabricate consumer products out of aluminum in Brazil (World Bureau of Metal Statistics, 1995, 2004, p. 9).

Outlook.—In 2003, Brazil, Guyana, Jamaica, Suriname, and Venezuela contained about 24% of the global reserves of bauxite (Plunkert, 2004). Brazil continued to increase its global significance as a primary aluminum metal producer. Mineração Rio do Norte

S.A., which produced about 84% of Brazilian bauxite in 2003, was expected to open the new Papagalo Mine with a capacity of 2 Mt/yr by the end of the year. CVRD expects its new Paragominas Mine to begin production of 4.5 Mt/yr by 2005. By the end of 2006, construction of a fourth and fifth production line is expected to be completed at the Alunorte refinery in Brazil, which could increase alumina production capacity by 75% compared with that of 2003. By prepurchasing electricity and investing in development of more electricity generation capacity, CVRD expects to continue to produce primary aluminum at the listed capacity of its Albras facility where production capacity is expected to reach 440,000 t/yr by 2005 owing to ongoing modernization efforts (ALBRAS-Alumínio Brasileiro S.A., 2005, p. 7, 23). Also, Companhia Brasileira de Alumínio plans to increase primary aluminum smelter capacity at its Sorocaba plant to 385,000 t/yr by the end of 2005 from 340,000 t/yr at the end of 2003 (Companhia Brasileira de Alumínio, 2003§).

In Jamaica, new investment in the production of bauxite was increasing in 2003 as a result of the Government agreeing to remove a nearly 30-year-old levy on bauxite production in 2002 (Alcoa Inc., 2005a§). As a result, Jamaican production of bauxite is expected to increase by at least 8% by 2005 compared with that of 2003 (table 5). In addition, Alumina Partners of Jamaica (Alpart) and Jamalco are expected to increase alumina refining capacity through 2005. Alpart is expected to increase alumina refining capacity to 1.65 Mt/yr by 2004 from a capacity of 1.45 Mt/yr in 2003, and Jamalco plans to increase its alumina refining capacity to 2.65 Mt/yr in 2005 from 1.25 Mt/yr in 2003. Alumina refinery capacity across all four refineries in Jamaica is expected to increase from 4.0 Mt/yr in 2003 to about 4.2 Mt/yr in 2004 and to about 5.6 Mt/yr by 2007 or 2009.

In 2003, 34% of total investment in the mining industry of Venezuela continued to go toward the development of bauxite production; this level of investment was expected to continue through 2008. The investment is expected to have its first real impact on bauxite production in 2009 (table 5). In 2003, CVG Bauxilum C.A.'s Ciudad Guayana alumina refinery in Venezuela, which was being expanded, is expected to reach a capacity of 2.0 Mt/yr by the end of 2004; a feasibility study will be undertaken to ascertain if capacity could be raised to 3 Mt/yr by 2009. In anticipation of producing more bauxite feed for this refinery, CVG completed an expansion in 2003 to achieve a capacity of 6 Mt/yr at its Los Pijiguaos Mine (CVG Bauxilum C.A., 2005§). Also in Venezuela, CVG Aluminio del Caroní S.A. received financing in 2003 for expansion of its primary aluminum metal smelter's capacity to 450,000 t/yr from 210,000 t/yr in 2003. The company expects to complete the project by the end of 2007.

In 2003, Alcan Ltd. controlled about 56% of Canadian primary aluminum smelter capacity and expected to increase capacity at its Alma smelter by 2005, which would raise Canada's production capacity to 3 Mt/yr from about 2.8 Mt/yr. Alcan has announced that it will require an annual average market price of about $1,400 per metric ton before beginning any additional projects. If the expansion of Alcoa's Baie-Comeau and Deschambault aluminum plants is completed, then the combined capacity of the company's three plants in Quebec will be 1.4 Mt/yr, although the proposed modernization project at Baie-Comeau is subject to substantial uncertainties. In March 2003, Alcoa signed an MOU with the premier of Quebec to expand the production capacity to 570,000 t/yr from 250,000 t/yr at its Deschambault primary aluminum smelter; the timing of this project is subject to market conditions. Alcoa set a tentative start date for sometime in 2006; production is to start in 2008, and fully expanded operations are to begin no later than 2013 (Alcoa Inc., 2003a§).

In August 2003, Alcoa began a 250,000-t/yr expansion at the Paranam alumina refinery to increase the smelter-grade alumina production in Suriname. Alcoa expects to complete the expansion by the second half of 2005, which will raise total alumina production capacity at Paranam to 2.2 Mt/yr. Alcoa expects its majority-owned affiliate Suriname Aluminum Company, L.L.C. (Suralco) to expand domestic production of bauxite to feed the refinery expansion. Together with the Government of Suriname, Suralco has also developed the necessary hydropower capability to use fully the additional alumina refining capacity at Paranam.

In 2003, Aluminio Argentino S.A.I.C. (Aluar) decided to postpone plans to expand the Puerto Madryn smelter in Argentina to a primary aluminum metal production capacity of about 400,000 t/yr from about 275,000 t/yr. This project has been rescheduled to start in 2007 (Aluminio Argentino S.A.I.C., 2004§). In Chile, Noranda Inc. has been promoting its 440,000-t/yr Alumysa project since the 1980s, but the project was the subject of numerous environmental complaints in 2003. Consequently, no clear timeline for its development has been set.

Copper.—*Production.*—From 2000 through 2003, mine production of copper in most of the countries of Latin America and Canada decreased somewhat owing to consecutive years of copper price levels falling below expectations. Peru, however, succeeded Canada as the second ranked producer among these countries, although annual mine production did not always increase even for this rapidly growing copper-producing country during this same timeframe (table 8). Even the world's leading copper producer, Chile, had a temporary decrease in production in 2002 mostly owing to production strategies initiated in 2002 by at least two of the leading producers in the country to reduce output by mining lower grades and/or stockpiling. Such policies were discontinued by BHP Billiton Plc (at its majority-owned Escondida Mine) and Corporación Nacional del Cobre (CODELCO) by the end of 2003 as copper prices recovered and reached their highest annual average levels since 2000. One result of these strategies was that CODELCO accumulated 200,000 t in stocks of copper during 2003.

In 1990, Chile and the United States mined about the same amount of copper, but U.S. production had decreased 29% by 2003, and Chilean production had increased by more than 208% during the same time period (table 8; Edelstein, 1996). Endowed with the world's leading reserves of copper, Chile is expected to supply copper to the United States and many other countries of the world through at least 2010. Peru doubled its capacity to produce copper from 2000 through 2003, but many companies chose to make portions of their productive capacity temporarily unavailable until prices improved. For example, a production capacity of at least 90,000 t/yr that had been unused during the previous 20 months at BHP Billiton Tintaya S.A.'s plant was reactivated in October 2003 (Ministerio de Energía y Minas, 2005). In 2003, the countries of Latin America and Canada were responsible for more than one-half of the world's copper mine output (table 4).

From 2000 through 2003, production of refined copper in the countries of Latin America and Canada followed a similar pattern as mine production and slight increases in metal production were registered only in Chile and Peru. Chile accounted for about 65% of all refined copper production in Latin America and Canada and about 19% of world refined copper production in 2003, which meant that Chile was the leading producer of refined copper in the world. In 2003, Peru was the 8th ranked producer in the world and accounted for about 3.4% of global production, and Canada was the 11th ranked producer and accounted for about 3.2% (table 9; Edelstein, 2005).

Consumption.—Although increased usage of copper in China often dominated discussions of global market demand, U.S. usage was still an important consideration for producers in Latin America and Canada where a vast majority of U.S. copper imports originated. In 2003, 36.5% of U.S. imports of unmanufactured copper were supplied by Chile; 28.1%, by Canada; 23.6%, Peru; and 5.9%, Mexico (Edelstein, 2005). As technology and substitutes for copper, such as optical fiber, have been developed, U.S. copper usage has decreased since 2000. In 2003, the U.S. share of the world's copper consumption was about 15%. Mexico was the leading consumer of refined copper among the countries of Latin America and Canada. Its share of global consumption was about 2.6%. The combined global consumption of Latin America and Canada was less than 7% (Comisión Chilena del Cobre, 2004, p. 91).

Certainly, increasing imports of copper by China had a large effect on copper producers in Latin America and Canada. In 2003, China imported 2.67 Mt of copper concentrates, of which Chile was the second ranked supplier and Peru was the fourth ranked supplier. China also imported 1.36 Mt of refined copper, of which Chile was the leading supplier (Tse, 2005).

Outlook.—Between 2003 and 2009, copper mine production in the countries of Latin America and Canada is expected to increase by about 31%. This is due to expected startups, restarts, and expansions of production of copper from mines that have not been put into full production during the recent period of decreasing copper prices. Among these countries, copper production in Canada remains quite susceptible to temporary declines in global market prices for copper owing to higher costs of production. No new copper developments are expected in Canada until 2005, at the earliest, even though the copper price began to recover toward the end of 2003. The most anticipated project in Canada is at Voisey's Bay, but copper production is not expected to achieve its potential there until 2006. Elsewhere in Canada, production was reduced by 6% at Highland Valley Copper Mine, the Myra Falls Mines were temporarily closed, and lower ore grades were being mined at Kidd Creek copper mines in 2003. By 2005, the potential output from restarting and/or expanding these projects and the potential copper production out of Voisey's Bay suggest that mine production of copper in Canada will again exceed its 2000 level as early as 2007, and production will continue to increase in Canada through 2009.

In 2003, about 32% of the world's copper reserves were located in Chile (Edelstein, 2004). As the copper price improved towards the end of 2003, expansions were resumed at the Chuquicamata and the Escondida Mines, as well as at other mines in Chile. In addition to Peru's Tintaya Mine remaining operational through 2005, capacity expansion and mining of higher grades is expected at the Antamina Mine, and increased production at the Toquepala Mine is also expected. Restructuring and modernization at other copper mines in Peru is expected to combine with these main expansions to rank Peru among the top three copper producers in the world by 2005. During 2003, a successful prefeasibility study was completed on the Rio Blanco copper project in Peru; production of about 100,000 t/yr of copper is expected to begin by 2008 (Monterrico Metals plc, 2004§). Also in Peru, Minera Yanacocha SRL planned to finish the environmental impact assessment (EIA) for the copper-gold project at Minas Conga by 2006; operations are expected to start by 2011. In Brazil, the new Sossego copper-gold mining project is expected to produce 140,000 t/yr of copper starting in 2004.

Growth in global demand for refined copper, led by China, is expected to exceed growth in supply at least through 2005 (Warwick-Ching, 2005). In Canada, Noranda announced that anode production would be reduced to 145,000 t from 186,000 t by mid-2004, as a result of the company's restructuring program at its Horne smelter in 2003 in Rouyn-Noranda, Québec, Canada (Noranda Inc., 2003§). In Chile, Alliance Copper Ltd. plans to begin copper production in 2004 at a prototype plant at Chuquicamata where a new bioleaching process to treat copper concentrates that contain from 2% to 4% of arsenic is planned. Southern Perú Copper Corporation (SPCC) planned to build a new copper smelter in Ilo, Peru, that will produce anodes instead of blister by the end of 2006. This plant is expected to process 1.83 Mt of copper concentrates from SPCC's newly expanded Toquepala Mine. In Brazil, Caraiba Metais S.A. (CMSA) planned to increase production of copper metal to 500,000 t/yr by 2010 from about 173,000 t/yr in 2003. CMSA imports most of the copper cathode it refines from Chile and Peru. Led by Chile, the countries of Canada and Latin America are expected to play a leading role in ramping up the growth rate in global supply to catch up with that in global demand, possibly by 2007 (Warwick-Ching, 2005).

Gold.—*Production.*—Mine production of gold has evolved since 1990 to make Peru the leading producer in 2003. Gold production in Brazil has declined drastically and has decreased gradually in Canada, which was the second ranked producer, during the same timeframe (table 10). In 1990, Peru was ranked about 20th internationally in terms of the country's mine output of gold. Since then, the Yanacocha Mine has grown to become the world's second ranked gold mine (Lucas, 1996). In 2003, Minera Yanacocha S.R.L. increased annual production by making technological improvements to increase gold recovery and by increasing output at the La Quinua Mine by mining higher grades (Newmont Mining Corporation, 2004, p. 84).

In Canada, annual gold production continued to decrease in 2003 owing to mine closures, such as the Con Mine and the Lupin Mines; temporary suspensions of production; and some depletion of gold reserves (Kinross Gold Corporation, 2003§; Miramar Mining Corporation, 2003§). Production of gold as a byproduct has also been decreasing since 2000 in Canada owing to the decreasing annual average prices of frequently coexisting metals. Annual production of gold picked up in 2003 in Latin America, however, because lower cost operations were more responsive to the slightly higher average annual gold price in 2003.

In Brazil, annual gold production was no longer decreasing in 2003, but mine output of gold was still about 88% of that of 2000 and about 44% of the production level in 1990 (table 10). The predominantly gold-producing Igarapé Bahia Mine in Carajás was closed during 2003 owing to depleted reserves, but increased production of gold as a byproduct of predominantly copper-producing mines around Carajás, such as the Sossego Mine, more than compensated for this loss (Companhia Vale do Rio Doce, 2002). The garimpeiros, who are local workers that use very little technology in production and are often grouped into small syndicates or backed by Brazilian companies, also appeared to increase production in 2003, although official statistics are unavailable.

In 2003, Colombia achieved a historically high level of mine production of gold, although most of Colombia's gold production was still from small- and medium-sized alluvial operations that use artisanal methods for gold extraction, which are similar to the methods used by the garimpeiros in Brazil. Some of the additional production came from these types of artisanal operations that moved into mines previously abandoned by higher cost mining companies. Higher cost production using modern methods in vein-type mines also increased.

In 2003, about 40.3% of all gold output in Chile was a byproduct from mines that predominantly produced copper. Fluctuations in Chilean mine production of gold has recently depended heavily on trends in copper production. Annual total gold production from all gold-producing mines in Chile was no longer declining in 2003, although it was only about 72% of the country's gold output in 2000. Higher gold production at the Escondida copper mine and Cía. Minera Mantos de Oro's La Coipa gold mine was sufficient to offset reductions at Cía. Minera Meridian's El Peñón gold mine, among others. This resulted in a slight recovery in the annual level of Chilean gold production.

In 2003, substantial progress was made on new gold developments in Central America; Guatemala and Honduras have accounted for most of the new production of gold since 1995. In Mexico, Industrias Peñoles, S.A. de C.V. closed its Las Torres gold-silver mining unit in September. The Korri Kollo Mine in Bolivia, which at times during the past 15 years was the leading gold mine in South America, closed its operations in 2003. The countries of Latin America and Canada accounted for about 21% of global mine production of gold; Peru accounted for about 6.7% (table 4). Peru was the fifth ranked producer of gold in the world, and Canada was seventh (Amey, 2005).

Outlook.—Among the countries of Latin America and Canada, Canada had the highest percentage of global gold reserves in 2003 (3%), and Peru held only about 0.5% of the world's reserves (Amey, 2004). Although Peru was the leading producer in 2003, Canada's annual mine production of gold may exceed that of Peru by 2007, assuming that the price of gold remains high enough to cover the higher costs of production in Canada. Total gold production in Latin America and Canada is expected to increase in 2004 primarily owing to the planned restarts of mining projects that have been temporarily suspended.

Significant increases in gold production in Peru from BHP Billiton Tintaya, Compañía Minera Aurifera Aurex, Compañía Minera Huarón, and Compañía Minera de Sandia y Corporacion Minera Ananea in 2004 are expected to be balanced through 2005 by decreased production owing to mining lower grades elsewhere in the country (Ministerio de Energía y Minas, 2005). Peruvian mine production of gold and other metals, such as copper and silver, has been subject to numerous political protests that have been intensifying since 2000 (InfoMine Inc., 2005§). Thus, future mine production through 2005 is expected to be more uncertain in Peru.

In 2003, Newmont Mining Corporation announced that it could not predict how these demonstrations might affect production at its operations in Peru. In 2000, a Newmont contractor spilled about 151 kilograms (kg) of elemental mercury near the company's majority-owned Yanacocha Mine; legal proceedings concerning damages to local residents were still ongoing in 2003. In 2003, additional expansion of Yanacocha into the nearby gold deposit of Cerro Quilish and other mining development projects in the area were subject to a surge in protests that centered around the concerns of farmers that mining puts their coffee crops, water, and farm land at risk in the region (Orozco, 2005§). Mining companies in the region have responded by adjusting their plans for development; for example, to use more flotation instead of cyanide at Yanacocha's proposed Minas Conga project. Minera Barrick Misquichilca S.A. expects to start gold production at its Alto Chicama Mine in the latter half of 2005, but production at the company's Pierina Mine is expected to drop to about 20 t/yr in 2004 from about 28 t/yr from 2000 through 2003 because lower grades were being mined (Barrick Gold Corporation, 2004, p. 12, 16). Yanacocha's increased gold production capacity in 2003, primarily owing to projects in La Quinua Basin, is expected to maintain the company's gold production at the high 2003 levels. New projects, such as the Minas Conga gold-copper project, are not expected to enter production until after 2007 (Newmont Mining Corporation, 2004, p. 84).

One example of a mine that is expected to restart operations in the near future is the Refugio Mine in Chile; production capacity could total about 3.6 t of gold in 2005 and rise to 7.5 t/yr starting in 2006. In Central America, higher gold prices at the end of 2003 caused renewed interest in many projects that had raised expectations for gold production in Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama. Overcoming the dearth of gold mining investment in this region during the past 10 years, the lack of trained labor, and environmental concerns, especially in Costa Rica, may still delay many of these projects until 2005 or 2007. The Costa Rican Government, however, granted preliminary environmental approval for gold production to begin at Bellavista in 2005 and Cerro Crucitas in 2009.

Although gold prospects in Latin America will continue to be the focus of many mineral exploration firms, the expected effects on production from these ventures are uncertain. A couple of countries that did not report much official production of gold in 2003, but have historically been significant gold producers, appeared to be approaching advanced development after some extended exploration efforts. In the Dominican Republic, Corporación Minera Dominicana continued to develop the Cerro de Maimón deposit and initially expected to commission the mine and mill in late 2004. By the end of 2003, however, this timeline had been indefinitely postponed. In Ecuador, a feasibility study (not yet considered to be bankable) at the Río Blanco deposit was begun at the end of 2003, and completion of that stage of drilling is not expected until sometime in 2005.

Through 2009, output of gold is expected to rise with further development of the gold deposits associated with the Veladero Breccia system in Argentina and the Mundo Novo Greenstone Belt in Brazil. In Argentina, the Agua Rica Mine had achieved bankable feasibility by the end of 2003 and is expected to enter production by the end of 2008. Barrick Gold Corporation's Veladero gold mine is expected to begin production in 2005, and its Pascua Lama project is expected to begin gold production in 2009.

By 2005, production is expected to increase in Mexico owing to the completion of a couple of projects, which will include Metallica Resources Inc.'s Cerro San Pedro gold and silver project. In February 2003, the company updated the mineral reserves at Cerro San Pedro and estimated that the mine could operate for 8.5 years at a production rate of about 2,800 kilograms per year (kg/yr) of gold. Conditional upon mining permits being obtained in the expected manner, Metallica expected production to begin in 2005. Venezuela is expected to achieve annual rates of gold production close to previously recorded high levels (about 20 t in 1997) by 2009 through development of Las Cristinas gold project. In Bolivia, gold mine production by medium-scale mining companies is expected to decrease steadily through 2009, except for production of gold as a byproduct of new silver or other metal mining operations; gold production, therefore, is expected to rely increasingly on the less technological (artisanal) sector, for which reliable estimates of production are generally unavailable.

Iron Ore, Pig Iron, Direct-Reduced Iron, and Steel.—*Production.*—In 2003, Latin America and Canada's share of global production of direct-reduced iron (DRI), iron ore, crude steel, and pig iron amounted to 35.5%, 31.7%, 7.9%, and 7.4%, respectively. Gas-based processes accounted for almost 90% of global production of DRI. The world's leading producers of gas-based DRI were, in order of output value, Venezuela and Mexico; this was due, in part, to the ample supplies of cheap natural gas in those countries (table 4; Fenton, 2005). In 2003, Argentina and Trinidad and Tobago were also significant producers of gas-based DRI. Trinidad and Tobago enjoyed access to sufficient supplies of natural gas. Argentina, however, was forced to secure natural gas imports from Bolivia and Brazil to meet the country's growing energy demands.

The leading producer of iron ore in the world was Brazil, where CVRD's share of global production was 17.8% in 2003 compared with 14.5% in 2002. In addition, CVRD's 60.2% owned subsidiary Caemi Mineração e Metalurgia S.A. (Caemi), which was Brazil's second ranked producer of iron ore, opened three new mines in late 2003 to replace capacity lost as a result of the depletion of reserves at two of Caemi's other mines. Caemi's net iron ore production capacity was estimated to be 32 Mt/yr in 2003. Expansion of production at these three new mines was ongoing. After Brazil, which accounted for more than 76% of iron ore production by the countries of Latin America and Canada in 2003, the locally significant producers of iron ore were, in order of the value of each country's total output, Canada, Venezuela, and Mexico (table 11). In Peru, Shougang Hierro Perú S.A. (a subsidiary of China's Shougang Corp.) completed a new pellet plant to increase production capacity to 4 Mt/yr in iron ore content in 2003 from 3 Mt/yr since the company's last Peruvian expansion in 2001.

Production of crude steel can be correlated with pig iron production and this has mostly been true for the three major steel-producing countries in Latin America and Canada (Brazil, Canada, and Mexico) from 1990 through 2003. In 2003, Brazil continued to be, by far, the leading producer of pig iron in Latin America and Canada and growth in production in that country has outpaced that of crude steel since 1990. Unlike in Brazil, Canada's production of crude steel has increased more rapidly than the country's output of pig iron, which has remained basically flat since 2000. In 2003, Mexico's annual production of pig iron and crude steel began to recover in 2003 but still had not attained that country's 2000 levels for either ferrous metal (tables 12, 13). In 2003, Brazil was the fifth ranked producer of pig iron in the world (Fenton, 2005). Brazil accounted for about 3.2% of the world's crude steel production; Canada, 1.7%; and Mexico, 1.6% (table 4).

Consumption.—Pig iron and DRI production tend to be direct indicators of iron ore consumption; the level of crude steel production is less of an indicator because part of steel production comes from scrap-consuming minimills. As one of the world's dominant exporters of iron ore in 2003, Brazil exported about 21 Mt compared with about 14 Mt in 2000. Brazil's share of annual U.S. imports for consumption of iron ore continued to decrease in 2003. About 3.8% of Brazilian iron ore exports was shipped to the United States, and 16% was shipped to China. This change reflected a recent relative shift towards satisfying Chinese demand and away from satisfying U.S. demand; 5.2% of Brazil's iron ore exports was shipped to the U.S. in 2000, and 9% was shipped to China. In 2003, CVRD was also able to enter into long-term contracts with the firm's newer customers, which included the Chinese, to buy Brazilian iron ore for the next 3 to 10 years; most sales to China had been by spot market purchases for delivery during a 12-month period, at most. Meanwhile, imports of iron ore from Canada seem to have made up for the decrease in imports of iron ore from Brazil as a share of U.S. consumption. Canada's share in U.S. iron ore imports for consumption was about 55% in 2003 compared with about 50% in 2000 (Ericsson, 2004; Jorgenson and Kirk, 2005).

In 2003, the United States imported about 10% of its apparent steel consumption; about 23% of these imports of steel mill products was provided by Canada, and about 14%, by Mexico. In 2003, the Chinese share of global crude steel consumption was about 27%; and almost all growth in global consumption occurred in Asia. In 2003, China acquired about 30% of its crude steel imports from Latin America (excluding Mexico). Annual consumption of crude steel within Mexico increased by about 5% in 2003, and Brazil's and Canada's annual consumption of steel products decreased by 3.6% and 2.5%, respectively (Fenton, 2005; International Iron and Steel Institute, 2004a§, b§).

Outlook.—Production of iron ore in Brazil, Canada, and Mexico is expected to level off after 2005, but Venezuela is expected to increase output and produce only slightly less iron ore than Canada by 2009. This is because of the expected completion of a new 8-Mt/yr concentration plant and plans to reopen the Altamira Mine in Venezuela. In Peru, Shougang continues to be the only iron ore producer and expects increases in output of iron ore through 2007 (table 11). In Brazil, CVRD started up its 12th iron pellet plant in 2003 and plans to invest about $6 billion in Brazilian mining through 2007. CVRD plans to focus much of this investment on opening up supply lines and investing in a better infrastructure to bring the iron ore to the markets more efficiently.

Global demand for iron ore is expected to remain strong through 2009, primarily driven by growth in Chinese demand but also owing to rapid growth in demand in India. Therefore, global supplies of iron ore are expected to remain tight until at least 2006 as openings of additional capacity, which included in the countries of Latin America and Canada, are expected to continue to lag behind growth in demand (JPMorgan Chase & Co., 2005, p. 3). In 2003, Brazil had about 7% of the world's iron ore reserves in terms of iron content; Venezuela, 3.4%; and Canada, 1.6% (Kirk, 2004). Chile is facing lower grades and diminishing reserves of iron ore through 2009.

A large boost to iron ore production in Latin America could potentially come from the eventual development of the El Mutún iron ore deposit in Bolivia. The Brazilian steelmaker, Siderúrgica Sul Catarinense S.A. (SIDERSUL) has made repeated attempts to acquire the rights to develop this resource, which is commonly believed to be one of the largest undeveloped iron ore deposits in the world. The Bolivian state mining entity, Corporación Minera de Bolivia (COMIBOL), however, is entitled by the Bolivian constitution to earn royalties on any future production from El Mutún, which is remotely located within a 50-mile national "strategic zone" near the Brazilian border. Thus, the ongoing obstacles to attracting the necessary investment to develop this resource, which is expected to remain mostly undeveloped and 100% controlled by the Bolivian Government through at least 2005, are many.

As of 2003, Government ownership of significant global steel production capacity was basically concentrated in China. Looking forward, Chinese steel production remains the greatest source of risk in the global steel industry in terms of generating overcapacity and low prices. Recent privatization and consolidation of much of the steel industry, which included in the countries of Latin America and Canada, is expected to limit global overcapacity generation through 2009. In 2003, demand for iron ore and steel in China was so strong that technology that was recently considered obsolete was operating profitably in many countries to meet Chinese demand. In response to China's recent evolution into a major global importer of iron ore, Brazil appears to be leading the countries of Latin America and Canada in initiating greenfield feasibility studies to generate new iron ore production capacity. In Brazil, the earliest expected date for any new capacity to enter production would be after 2007.

In the future, economists expect that any new crude steel production capacity will be economical only if it is located very close to significant iron ore resources, such as those in Brazil. Expansions of existing capacities at steel production facilities in Latin America and Canada are expected to proceed cautiously through 2009 owing to increased global market power and strategies to minimize the risk of generating overcapacity by private owners of the steel-producing firms in these countries (JPMorgan Chase & Co., 2005, p. 31-51).

Lead.—*Production.*—Since 1990, Latin America and Canada's overall mine output of lead has been in steady decline; the major exception was Peru. Mine production of lead in the other major producing countries, Canada and Mexico, has been primarily responsible for this decline. Canada was the leading lead producer in Latin America and Canada in 1990 but had cut mine output of lead by about 66% by 2003. Mexico's mine production of lead was basically flat between 2000 and 2003 (table 14). Mexico's leading producer of lead and zinc, Peñoles, shut down its El Monte lead-zinc mine in March 2003 owing to the depletion of reserves. In 2003, Peru, Mexico, and Canada were the fourth, fifth, and sixth ranked mine producers of lead in the world and accounted for about 9.5%, 4.3%, and 2.5% of global mine output, respectively (table 4; Smith, 2005).

The leading producers of primary refined lead in Latin America and Canada were, in order of global ranking, Mexico (seventh), Canada (eighth), and Peru (ninth), which accounted for about 4.1%, 3.6%, and 3.3% of global production, respectively (table 15; Smith, 2005). In 2003, Noranda's decision to move the lead smelter at its Brunswick operations to a seasonal 8-month schedule significantly reduced Canadian annual production of the metal (Noranda Inc., 2004, p. 26). In Peru, lower output of lead concentrates from Volcan Compañia Minera S.A.A. resulted in lower annual metal production at Doe Run Peru S.R. Ltda.'s La Oroya smelting complex (Cooper, 2004). In Mexico, the resumption of mining operations at Peñoles' Bismark Mine at the end of 2002 helped provide more feed to the company's Met-Mex lead-zinc refinery and increased lead metal production to a level closer to the refinery's listed capacity in 2003 (Industrias Peñoles S.A. de C.V., 2002§)

The leading producers of secondary refined lead in Latin America and Canada were, in order of global ranking, Mexico (seventh) and Canada (eighth), which accounted for about 3.6% and 3.5% of the world's recycled production of the metal, respectively (Smith, 2005). Since 1990, as automobile and battery use has increased in Mexico, so has production of secondary (recycled) refined lead risen from 28% of total refined lead production (including secondary) to about 45% in 2003 (table 16).

Consumption.—In Mexico, refined lead consumption increased by about 17% in 2003 compared with that of 2002 owing to increases in the production of automotive batteries. Mexico was the leading consumer of lead in Latin America and Canada in 2003. Production of lead-acid batteries continued to be the dominant use of lead in Latin America and Canada, and use of lead was closely correlated to trends in the international automobile industry (World Bureau of Metal Statistics, 2004, p. 82; Smith, 2005).

Outlook.—The expectation of slight increases in Latin America and Canada's mine production of lead through 2007 can be attributed to the cumulative effect of small expected increases in Bolivia, Canada, Honduras, Mexico, and Peru. A long-awaited development in Bolivia—the Apex Silver Mines Limited's San Cristobal lead-silver-zinc project—appears to be approaching the possibility of production. In 2003, San Cristobal reportedly hosted proven and probable reserves of 210,970 Mt of ore with a grade of 0.61% lead. The Bolivian Government would like any eventual production of lead and silver from this project to be smelted at the Karachipampa smelter in Bolivia. This smelter was designed and built in 1983 by German and Belgian engineers and it was the property of COMIBOL in 2003. It was specifically designed to process feed from a mine at San Cristobal, but such a mine had still not materialized through 2003. Thus, the smelter has never been used and has fallen into disrepair. Consequently, Apex plans to transport the ore through Chile to be smelted elsewhere.

By 2005, the production of primary refined lead in Latin America and Canada is expected to increase most significantly in Canada and Mexico (table 15). In Canada, many lead-producing mines are on care and maintenance until metal prices improve even more than in 2003, especially the annual average price of zinc. Most prices for metals that are associated with lead, which include those for zinc, are expected to improve sufficiently enough by the end of 2004 to cover mine operation costs in Canada, which are much higher than those in Latin America. Therefore, Canadian refineries are expected to be using much more of their available primary lead refining capacity by 2005. Prices of associated metals were already high enough by the end of 2003 to generate expectations for increased use of existing lead refining capacity in Mexico during 2004. Through 2009, production of secondary refined lead is expected to remain basically the same in Latin America and Canada, except in Argentina where slight increases are expected (table 16).

Nickel.—*Production.*—In 2003, Latin America and Canada's share of global mine production of nickel amounted to slightly more than 30%, and that of refined nickel production, about 23% (table 4; Kuck, 2005). Although mine production of nickel in Latin America and Canada appeared to be basically flat between 2000 and 2003, production in Brazil and Canada decreased substantially.

Through 2003, much of the potential capital for investment in continuing nickel production in Canada became increasingly tied up in pensions for ageing workers in the nickel production sector (Rae, 2005). In 2003, Canada accounted for a 12% share of the world's production of nickel ore and produced about 10% of global refined nickel (table 4; Kuck, 2005). In 1990, Canada produced slightly more than 20% of the world's mine output of nickel and about 15% of the world's refined nickel (Kuck, 1996). A 2002 strike at Canada's leading nickel producer, Inco Limited, carried over into the first half of 2003, although Inco remained the second ranked producer of nickel in the world in 2003.

By 2003, mine production of nickel had increased substantially since 1990 in Colombia and Cuba, and production in Venezuela, which began in 2000, continued to expand in 2003. Mine output in the Dominican Republic has increased since 1990, but not steadily, with a production level in 2003 less than that in 1995 (table 17). Colombia's only producer of ferronickel was Cerro Matoso S.A., which mined a higher tonnage and increased the average grade mined to achieve 87% of the company's 81,430-t/yr production capacity in 2003.

The Government of Cuba reported refined nickel production on a contained nickel plus cobalt basis mostly for oxide but also for some sulfide precipitate. In 2002, nickel was Cuba's second ranked source of foreign exchange, and the Government was very active in 2003 in seeking financing for a nickel refinery in Punta Gorda and a ferronickel plant at Las Camariocas. In January 2003, Cuba's state-run nickel producer, Cubaníquel, signed a sales agreement and two other letters of intent with China's Minmetals Group to invest in the nickel industry in Cuba.

Consumption.—In 2003, the United States was the third ranked user of refined nickel in the world after China and Japan, and Canada was the United States' leading international supplier of nickel with about 33% of U.S. imports for consumption. In Latin America, the Dominican Republic was the leading supplier of nickel to the United States and accounted for about 6% of U.S. imports (Kuck, 2005).

In 2003, Canada's domestic nickel consumption was only about 7% that of the United States and had been decreasing steadily since 2000. Brazil continued to evolve into a globally significant nickel user. The leading stainless steelmaker in Latin America was Brazil's state-run Companhia Aços Especiais Itabira (ACESITA), which was a major consumer of nickel in the country (Kuck, 2005). In 2003, Brazilian nickel consumption was about 21% that of the United States, and about three times that of Canada. Nickel usage in Mexico was still only about 10% of Canada's in 2003 (World Bureau of Metal Statistics, 2004, p. 105).

Outlook.—Globally significant nickel sulfide deposits are located in Canada and are expected to continue to provide the United States with much of its imported nickel. Significant laterite deposits, which are located in Brazil, Colombia, Cuba, the Dominican Republic, and Venezuela, are also expected to continue to contribute significantly to U.S. and global consumption, probably mostly in the refined form of ferronickel (Kuck, 2005). Combining reserves present in both types of deposits, Cuba contained about 9% of global nickel reserves; Canada, about 8.4%; and Brazil, about 7% (Kuck, 2004). The Dominican Republic is expected to continue to be a major supplier of nickel to the United States; proven and probable reserves are expected to last about 18 years at existing operating rates. The Cuban Government planned to increase nickel plus cobalt production to a total of 100,000 t during a period of 3 years beginning in 2004 and to increase production to 150,000 t during the subsequent 7 to 10 years.

Nickel production in Brazil and Canada is expected to recover considerably by 2005 as result of increased investment in 2003 in response to higher global demand for stainless steel and higher nickel prices. In Brazil, CVRD plans to increase nickel production capacity to about 40,000 t/yr at its Vermelho project, and Anglo American plc expects to achieve a similar level of nickel production at its Barro Alto nickel project in 2004. Inco is expected regain prestrike levels of production at Voisey's Bay, and Canada is expected to increase production back up to year 2000 levels by 2007.

The international market for nickel is expected to remain tight through 2010 with firms still reluctant to initiate large, high-cost, high-risk, greenfield projects, especially in countries where costs are already high, as in Canada. Smaller, brownfield expansions of already existing or previously closed projects, which are mostly in lower-cost countries, are expected to be the primary contributors to growth in global nickel supply through 2010 (Rae, 2005). In 2003, international nickel market conditions were becoming tight enough that Skye Resources Inc. decided to begin a feasibility study on restarting the Exmibal nickel mining and processing operation in Guatemala, which was permanently closed by Inco in 1980 owing to high energy prices and low nickel prices.

Platinum-Group Metals.—*Production.*—In 2003, Canada was the only significant international producer of PGM among the countries of Latin America and Canada; its share was about 4% of world production. Canada ranked third in the world in platinum production and fourth in production of palladium (Hilliard, 2005a). Colombia also produced some platinum, although less than one-half of what it produced in 1990 (table 18). In Brazil, CVRD produced some palladium as a byproduct of gold mining. In Canada, production of palladium suffered from a labor strike at the operations in Inco Ontario and a slower-than-anticipated ramp-up of those operations following a labor settlement in 2003. Inco's annual production was, therefore, lower than expected in 2003, but this was effectively offset by increased production at Palladium Ltd. in Canada (table 19; Gilmour, 2004).

Outlook.—Even without further labor problems, Canada's share of the global market for palladium could decrease through 2007. This is expected primarily because the annual average grade of palladium metal in Canadian ore began decreasing slightly in 2003. The timing of Canada's increased mining costs related to obtaining roughly the same amount of palladium metal from lower grade ore also coincides with technological changes that have allowed for a greater substitution of silver and base metals in applications where palladium has traditionally been used and with increased palladium output by Russia and South Africa (Hilliard, 2005a).

In 2003, global stocks of PGM were declining quite rapidly. Canadian production of palladium and platinum is actually expected to increase somewhat by 2005 in response to growing demand (tables 18, 19; Hilliard, 2005a). Combined with expected increases in other parts of the world, some analysts expect that the global supply of palladium will continue to exceed demand through 2006 (Gilmour, 2005). Canada's ability to maintain its market share in production of PGM through 2009, however, will be severely constrained because the country had only about 0.4% of global reserves in 2003 (Hilliard, 2004). Production of palladium and platinum is expected to remain basically flat from 2005 through 2009 (tables 18, 19).

Silver.—*Production.*—In 2003, Peru and Mexico were the first and second ranked mine producers of silver in the world, respectively, and Chile increased annual silver production to rank sixth worldwide, which moved it ahead of the United States and Canada (Hilliard, 2005b). The countries of Latin America and Canada accounted for about 43% of the world's mine production of silver in 2003 (table 4).

In Peru, Cía. de Minas Buenaventura S.A.A. continued to be the leading silver producer and produced about 367 t of silver in 2003, of which about 298 t was obtained from the company's large Uchucchacua silver mine (Compañía de Minas Buenaventura S.A.A., 2004). Volcan was the second ranked silver producer in Peru with about 296 t of silver produced in 2003, most of which was a byproduct of the company's lead and zinc mines.

In Mexico, annual mine production of silver temporarily decreased in 2003 to fall below the level achieved in 2000 (table 20). In 2003, Minera Hecla, S.A. de C.V. achieved its first full year of production at the designed capacity of its San Sebastian silver mine in Mexico (Hecla Mining Company, 2005§). Other Mexican small- to medium-sized silver producers demonstrated increased annual production in 2003. These increases were more than offset by Peñoles' closure of its Las Torres gold-silver mine owing to depleted reserves at the mine itself and exploration efforts in the area that did not reveal any other economically viable deposits, although Peñoles reported that the area around Las Torres still appeared to have geological potential (Industrias Peñoles S.A. de C.V., 2003b§). Peñoles's Fresnillo (Proaño) Mine was Mexico's leading producer and one of the world's most profitable mines. In 2003, production at Proaño reached slightly more than 995 t of silver.

In Chile, gold and silver were mined at Coeur d'Alene Mines Corporation's Cerro Bayo Mine. In 2003, Cerro Bayo accounted for about 11.5% of total Chilean mine production of silver and continued to expand its production since its start on the same site as the former Fachinal Mine in April, 2002. Most of the rest of the silver production in Chile was as a byproduct at the country's copper mines. In 2003, a 59% increase in annual silver output from the Escondida copper mine composed a significant share of the annual increase in mine production of silver in Chile.

Consumption.—In 2003, Mexico supplied 47% of U.S. imports for consumption of refined silver followed by Canada (30%) and Peru (13%) (Hilliard, 2005b).

Outlook.—Until 2003, many silver developments in the countries of Latin America were still awaiting expected increases in investment capital flows mostly from outside the region. In 2003, Pan American Silver Corp. of Canada completed construction of a plant to process an additional 600 metric tons per day of oxidized ore at its La Colorada Mine in Mexico. This development is expected to increase production capacity to 118,000 kg/yr of silver in 2004 compared with 24,300 kg/yr in 2003 at La Colorada Mine. Metallica expects that the Cerro San Pedro Mine will produce about 37,300 kg/yr of silver beginning in 2005.

In Bolivia, although critical timing of the necessary FDI may be delayed by recurring episodes of civil unrest, two major developments that concern silver production are expected to take place by 2009. First, Coeur d'Alene Mines expects to produce about 250 t/yr at its San Bartolomé silver project beginning in 2006. Second, Apex expects its San Cristobal lead-silver-zinc project in Bolivia to become the third leading silver producer in the world. San Cristobal had been on hold since 1997, however, because Apex was trying to raise the necessary capital during an extended period of depressed metals prices. In 2003, Apex was also awaiting the Bolivian Government's decision on an electrical energy supply contract to be signed with a Bolivian or Chilean company (Fox, 2004). San Cristobal reportedly has 211 Mt in proven and probable reserves with an average grade of 66 grams per metric ton of silver. The mine's expected life is 17 years.

The financial markets for silver have been relying on inventories from 1999 through 2003 because of stagnant global mine output. Tightness in the financial and production markets for silver finally resulted in higher prices towards the end of 2003, but a large financial transaction in silver was still required to boost the price high enough to spur the necessary capital flows toward projects like San Cristobal (Christian, 2005).

Production of gold, silver, and some copper at the Pascua Lama property that straddles the border between Argentina and Chile is expected to begin by 2009. In Chile, a feasibility study was underway in 2003 on potential open pit mining in the Laguna Verde area and at the nearby Cerro Bayo Mine. Expansion of mine production of silver at Cerro Bayo is expected by the end of 2005 if precious metals prices improve as much as expected in 2004. Cerro Bayo has the capacity to increase silver metal production immediately in the event of receiving more ore for processing; 2003 processing was running at just 70% of Cerro Bayo's mill capacity. Exploration efforts at Cerro Bayo are ongoing, and Coeur d'Alene expects the Cerro Bayo property will eventually prove to contain more than 2,200 t of silver reserves.

In Peru, the reopening of copper mining operations at BHP Billiton Tintaya at the end of 2003 and expansions at Volcan were expected to increase silver production as a byproduct of those mining operations considerably in 2004 (Ministerio de Energía y Minas, 2005). These developments, combined with a full year of production after 2003 improvements at Buenaventura's Uchucchacua silver mine, are expected to increase annual silver production in Peru in 2004; this increase is expected to be at least maintained through 2009 (Compañía de Minas Buenaventura S.A.A., 2004).

Tin.—*Production.*—In 2003, Peru was the third ranked mine producer of tin in the world, behind China and Indonesia. Bolivia and Brazil were the fourth and fifth ranked countries in mine production of tin, respectively, although even combined they did not produce as much tin as Peru. Minsur S.A. was the only company that produced tin in Peru and was the world's second ranked tin company and accounted for about 14.2% of global mine production (Carlin, 2005).

A lack of investment at Bolivia's largest tin mine, Huanuni, meant that mine output was inconsistent, and the growing need for upgrades was not dealt with in 2003. In 2003, rumored FDI in the mine was also the target of demonstrations that included many artisanal miners interested in halting technological developments and foreign investment. These miners were loosely organized in cooperatives that were interested in obtaining the remaining tin resources deeper in the Huanuni Mine by traditional methods, rather than by modern methods that would employ fewer Bolivians. COMIBOL owned the royalty rights on any production out of Huanuni and had administrative control of the mine through 2003 after the financial collapse of the last foreign investor, RBG Resources plc, in 2002. RBG Resources was granted rights to Huanuni in 2000 on the condition that it invest $10.25 million in upgrades. COMIBOL announced at the end of 2002 that RBG had apparently failed to upgrade the mine much by the time the property was returned to COMIBOL's control. In 2003, tin production at the mine was apparently higher than in 2000 primarily owing to greater access to the mine's deposits by a larger number of individual miners.

In Brazil, garimpeiros were the major producers of tin. In the larger scale, more modern tin mining operations of Brazil, production cuts have been made during the past 5 years at the Pitinga Mine, and a spokesman for Mamore S.A. (a wholly owned subsidiary of Grupo PARANAPANEMA) admitted in February 2003 that reserves at Pitinga were exhausted and that the firm was just reprocessing tailings.

Peru was by far the leading producer of tin metal in the Latin American and Canada countries and smelted all its mine production of tin concentrate domestically in 2003 (table 22). Peru was ranked behind only China and Indonesia in global tin smelter production of the metal (Carlin, 2005). In 2003, Peru contained about 12% of global tin reserves, Brazil about 8.9%, and Bolivia about 7.4% (Carlin, 2004). Brazil's metal output has declined steadily since 1990 because mine production of tin has decreased. In Bolivia, smelter output of tin metal has been volatile since 1990 because ownership of the Vinto tin smelter switched hands repeatedly from 1990 through 2003. Also, the Huanuni Mine typically supplied about 70% of the tin processed at the Vinto smelter so labor disruptions and ownership changes at Huanuni were correlated with fluctuations in tin metal output by the Vinto tin smelters.

Consumption.—Tin has not been mined in the United States since 1993; consequently, the country is mostly reliant on imports and recycling for its tin needs. In 2003, Peru and Bolivia were the first and second ranked suppliers of primary refined tin to the United States, respectively (Carlin, 2005).

Outlook.—In Brazil, Marmoré expects to extend mining operations at the Pitinga Mine by developing the Rochas Sur project at Pitinga to expand production at the mine to 14,300 t/yr by 2004. In Bolivia, Coeur d'Alene's San Bartolome project is expected to produce significant amounts of tin in addition to its primary production of silver and is expected to start production by the end of 2006. In Peru, Minsur's San Rafael Mine was operating at 100% of installed capacity in 2003, and the company plans to increase the capacity of the beneficiation plant at San Rafael by about 67%; almost no expansion in production is expected until after 2009, however (Minsur S.A., undated§).

Titanium.—*Production.*—In 2003, Canada was the third ranked producer of titanium mineral concentrates in the world. Brazil was the only other significant producer in Latin America and Canada (table 23). In 2003, Canada was estimated to contain about 7.4% of global reserves of ilmenite (Gambogi, 2005).

Consumption.—In 2003, Canada exported about 79,000 t of titanium dioxide pigment to the United States; this made Canada the third ranked global supplier of titanium for U.S. consumption after South Africa and Australia.

Outlook.—In Canada, QIT-Fer et Titane, Inc. is planning to increase production of its newest product, UGS titanium slag, to 600,000 t/yr from its 2003 capacity of 250,000 t/yr to supply the growing international market of pigment users that use the chloride process. To meet this production goal by 2007, QIT will also need to expand extraction of ilmenite ore to 3 Mt/yr.

Tungsten.—*Production.*—In 2003, Canada produced about 4.4% of the world's tungsten. Bolivia officially recorded some artisanal tungsten production in 2003. Any production in Brazil was also artisanal. In Peru, artisanal production was not reported but anecdotal evidence indicates that artisanal miners may have still been engaged in mining some tungsten.

In Canada, North American Tungsten Corp. Ltd. produced tungsten concentrates at its CanTung Mine and was responsible for all the country's production in 2003. Late in 2003, however, Osram and Sandvik terminated their purchase agreement with North American Tungsten, which was forced to suspend operations at the end of the year (North American Tungsten Corp. Ltd., 2004).

Consumption.—Canada accounted for 32% of U.S. imports from the rest of the world in terms of tungsten content, which made it the second ranked supplier of U.S. tungsten imports after China. Bolivia accounted for about 3% (Shedd, 2005). Consumption of tungsten in the countries of Latin America and Canada was not globally significant.

Outlook.—Although its Canadian production was apparently to be suspended for 2004 owing to the terminated purchase agreement with Osram and Sandvik, North American Tungsten immediately began searching for another purchaser. The company expects to be able to resume production at close to its 2003 level within 4 to 6 months after restarting operations (North American Tungsten Corp. Ltd., 2004). In 2003, decreasing export quotas and increasing domestic demand for tungsten in China were expected to increase the world price and allow companies like North American Tungsten to reenter the market in 2005 (Tse, 2005). If so, Canada is expected to produce at approximately 2003 levels from 2006 through 2009 (table 24). Canada contains the most reserves of any country in North America and South America (Shedd, 2004).

Lower cost production of tungsten out of a few countries in Latin America is expected through 2009, but this production is expected to be at globally insignificant levels. Forecasts that concern artisanal picking of tungsten in a few Latin American countries are not possible based on officially available statistics.

Zinc.—*Production.*—In 2003, Peru and Canada were the third and fourth ranked producers in the world, respectively, in terms of mine production of zinc. Mexico was the sixth ranked producer (Plachy, 2005). Zinc provides one of many examples of the shift toward lower-cost production (in Peru) from higher-cost production (in Canada) during a prolonged period of lower metal prices for the combined region of Latin America and Canada. In 1990, Canada dominated production among the countries of Latin America and Canada, but its mine production of zinc had decreased by about 34% by 2003. In Peru, mine production of zinc increased by about 130% during the same timeframe, although both Canada and Peru were estimated to have a similar reserve base for zinc production in 2003 (table 25; Plachy, 2004).

In Peru, Compañía Minera Antamina S.A. was the leading mine producer of zinc in Peru and produced approximately 400,000 t of zinc concentrate in 2003. Since the startup of the Antamina copper-zinc mine in June 2001, the owners have had difficulty in predicting the distribution of ore types that they have encountered on the basis of their original reserve model. Thus, in 2003, annual mine production of zinc was unexpectedly higher, and copper production was unexpectedly lower (Noranda Inc., 2004, p. 25). Volcan was the second ranked producer of zinc in Peru. In 2003, the mine production of zinc by Volcan was about 224,000 t. Glencore International AG of Switzerland completed its acquisition of the Rosaura lead-zinc mine in September 2003 through one of the company's Peruvian subsidiaries, Perubar S.A. Perubar was also responsible for exporting about 50% of the annual production of zinc concentrate from Rosaura and two other lead-zinc mines, Iscaycruz and Yauliyacu, which were owned by another Glencore subsidiary, Empresa Minera los Quenuales S.A. These three mines had the capacity to produce about 364,000 t/yr of zinc concentrate at the end of 2003 (Glencore International AG, 2004§). In 2003, however, Glencore was responsible for only about 189,000 t of mine production of zinc.

In 2003, the annual average price of zinc was about $0.83 per kilogram on the London Metal Exchange (LME) compared with about $1.13 per kilogram in 2000 owing to global stockpiling of zinc from 1999 to 2001 that reduced zinc prices and resulted in mine closures through 2003, especially in higher-cost countries like Canada (Roebuck, 2005). More than one-half of the approximately 750,000 t/yr of Western mine capacity, which included that of the countries of Latin America and Canada, was taken out of the market owing to low zinc prices after 2000 and was still on care and maintenance at yearend 2003 (Plachy, 2005). Although the annual average price of zinc increased by about 6.3% in 2003, this was not enough to restart or open any new Canadian mines just to recover zinc. Other metal prices, however, increased by significantly more than the zinc price. For example, the annual average copper price increased by about 14% in 2003. Therefore, some polymetallic operations in Canada, which included Noranda's Brunswick Mine, still found it economical overall to expand mine production of zinc in 2003.

In Mexico, two companies were responsible for 90% of zinc production during 2003—Grupo México, S.A. de C.V. and Peñoles. Peñoles, which was the leading mine producer of zinc in Mexico, produced about 57% of the country's total. Peñoles closed its El Monte zinc mine owing to a depletion of reserves. During the operating life of the mine, El Monte also produced significant amounts of silver as a byproduct (Industrias Peñoles S.A. de C.V., 2003a§). In Bolivia, zinc was the leading base-metal commodity produced in the country in terms of quantity and value. The leading zinc producer in the country was Compañia Minera del Sur S.A. (COMSUR); after the company's founder was pressured into a resignation of the Bolivian presidency amidst accusations of governmental-corporate corruption in 2003, it began seeking foreign investment assistance, which included soliciting investment from Glencore.

Consumption.—The United States imported about 58% of its apparent zinc consumption in 2003, and more than one-half of U.S. zinc metal imports were supplied by Canada followed by Mexico and Peru (Plachy, 2005). Bolivian zinc production was mostly exported to meet consumption needs in, in order of export value, Switzerland, Great Britain, and Belgium.

Outlook.—In 2004, Glencore is expected to increase mine production of zinc in Peru after a full year of production of about 34,000 t/yr with the company's restart of its Rosaura Mine. On December 8, 2003, Volcan entered into a pre-export finance agreement with Glencore to borrow about $40 million in exchange for a mortgage on Volcan's Andaychagua mining operations and an arrangement to sell lead and zinc concentrates to Glencore from 2004 to 2011. This agreement will allow Volcan to continue to finance improvements and expansions at the company's Andaychagua, Carahuacra, Cerro de Pasco, and San Cristobal Mines. These projects are expected to increase Volcan's production of zinc by about 5% per year through 2009 (Volcan Compañia Minera S.A.A., 2004§). At the Antamina Mine in Peru, a new drill program could be completed by 2005 in the hopes of resolving the uncertainty about the relative concentrations and locations of zinc and copper in the ore (Noranda Inc., 2004, p. 25).

About 80% of the idle zinc mines in the Western Hemisphere are estimated to be back in production by the end of 2005. Another 436,000 t/yr of output associated with Western projects has been deemed probable. Production of refined zinc is expected to increase by 1.7% to about 10 Mt in 2004, which is slightly below consumption. This imbalance could result in zinc price increases (Plachy, 2005).

In Canada, production of zinc is expected to begin increasing by the end of 2005 with production from the Bell-Allard Mine in the Matagami district and the Chisel North Mine at Chisel Lake. Also, a few restarts of zinc mining operations in Canada, such as at the Caribou zinc mine, are expected to proceed in 2004. In Bolivia, if the San Cristobal polymetallic project clears certain bureaucratic hurdles and Apex is able to raise enough capital to complete the project, then it is expected to produce zinc as a byproduct of silver by the end of 2005 with a full potential production capacity of 200,000 t/yr of zinc content the following year. In 2003, Peru contained about 7.3% of global zinc reserves; Canada, 5%; and Mexico, about 3.6% (Plachy, 2004).

In 2003, increasing global demand for zinc was increasingly matched through exploitation of stockpiles that even delved into "hidden" stocks rather than by increasing new production of the metal (Roebuck, 2005). Zinc metal production, however, is expected to increase through 2007 in all the countries listed in table 26, except in Canada where higher production costs must be overcome. In addition, if Apex Silver decides to smelt the ore out of San Cristobal at the lead-zinc Karachipampa smelter in Bolivia, then zinc metal production in Latin America and Canada could increase by somewhat more than is shown in table 26. The Karachipampa smelter has a reported production capacity of about 51,000 t/yr of concentrate.

Industrial Minerals

Diamond.—*Production.*—In 2003, Canada produced about 15% of the world's diamond, with the country's second mine, Diavik, starting production at the beginning of the year. Ekati Mine was Canada's first underground diamond mine and completed 5 years of production in 2003. Production grades and diamond quality began to wane during the year at Ekati. Canada was the third ranked producer of diamond in the world in 2003.

In Venezuela, alluvial diamond was mined by small-scale producers in 2003, often in cooperatives or under contract with Corporación Venezolana de Guayana (CVG). Production from year to year in Venezuela has been very uncertain, but annual production has generally been decreasing since 1990. Similarly, in Brazil, nearly every major river system contains alluvial diamonds, and many of these were mined by garimpeiros. Diamond production in Brazil also has been very uncertain from year to year; production was lower in 1995 than in 1990 then higher in 2000 but lower again in 2003. Since 2000, Guyana has increased diamond production by more than 400% (table 27). Guyana and Venezuela produced consumer-quality (gemstone) and industrial-quality natural diamond, and Brazil and Canada primarily produced consumer-quality natural diamond (Olson, 2005)

Consumption.—In 2003, Guyana was apparently the only country in Latin America and Canada to supply any notable amount to U.S. imports of natural industrial diamond (Olson, 2005).

Outlook.—Diamond production is expected to increase dramatically in Canada through 2009; this includes the production of 8 million carats per year at the Diavik Mine. De Beers Mining Canada expects production of 1.53 million carats per year at its Snake Lake project starting in 2008. In spite of dwindling reserves at Ekati, BHP Billiton Ltd. expects production of 4.7 million carats per year at its Panda project (an extension of Ekati) to start in 2005. In 2003, diamond exploration appeared to be slowing down in Canada because various kimberlite pipes yielded disappointing test results. New discoveries that are still under feasibility review include the Lac de Gras property and the Jericho project.

In Brazil, some advanced projects are the Juina diamond project, the Chapada alluvial diamond projects, a bulk sampling alluvial project in the Abaete River; the Canastra kimberlite project, and some work on properties in the area of Patos de Minas in Minas Gerais State where many kimberlites and lamproites have been found since 1995. Rio Tinto and BHP Billiton appeared to have terminated exploration for diamond by the end of 2003 in Brazil. In December 2003, Kansai Mining Corp. reported that a custom-built bulk-sampling plant would be in operation by May, 2004, at its Natal project in Venezuela, but De Beers announced in 2003 that it has withdrawn from diamond exploration in Brazil and Venezuela (Janse, 2004).

Phosphate Rock.—*Production.*—In Latin America and Canada, Brazil was the only globally significant producer of marketable phosphate rock in 2003 and was the seventh ranked producer in the world. Latin America and Canada possessed only about 5% of the world's capacity to produce marketable phosphate rock (Jasinski, 2005). Brazil expanded domestic phosphate fertilizer production in 2003 and produced about 4.9 Mt of phosphate rock. In Canada, Agrium Inc. dealt with unexpected costs in extracting phosphate rock from its Kapuskasing Mine and processing it at the company's Redwater plant but has improved annual productive performance since 1999 (Agrium Inc., 2004§).

Consumption.—From 1995 through 2003, South America emerged as the second ranked export market for U.S. producers of phosphate fertilizers (Jasinski, 2005). Consumption in Latin America has grown by about 95% since 1990 partly owing to large increases in soybean production, particularly in Brazil and Argentina (Mew, 2004). In spite of its increased production of phosphate rock, Brazil still required increased imports of phosphate fertilizer from the United States in 2003 compared with those of 2002. During the same timeframe, many other countries in Latin America, such as Argentina and Peru, increased significant imports of phosphate concentrates for consumption from the United States. Canadian imports of phosphate rock and monoammonium phosphate from the United States also increased in 2003 (Jasinski, 2005).

Outlook.—Opportunities to increase the land under cultivation in Brazil provide it with an opportunity to continue to increase its agricultural output and consumption of phosphate fertilizer (Mew, 2004). Production of phosphate rock is expected to remain basically flat in Brazil after 2005, however, because the country's domestic plants are expected to be operating at capacity by that time and Brazil was estimated to contain only about 1.4% of global phosphate reserves in 2003 (Jasinski, 2004). Capacity and production levels in the rest of the countries of Latin America and Canada are also expected to remain basically flat through 2009 (table 28).

Mineral Fuels

Coal.—*Production.*—In 2003, coal production in Canada continued its steady decline from a record high in 1997. Fewer than 20 coal mines were still operating in Canada, and the number decreased in 2003. In February 2003, Fording Inc., Luscar Coal Ltd., and Teck Cominco Limited merged their metallurgical coal assets in western Canada to form Elk Valley Coal Corporation (EVCC) (Elk

Valley Coal Corporation, 2004§). During the year, exports of metallurgical coal from western Provinces remained a major export commodity for Canada.

Colombia was the leading producer of coal in Latin America and produced mostly thermal coal for export. Production of coal in Colombia has been steadily increasing since 1990. Production of coal in Mexico has decreased since 2000. Venezuela was the third ranked coal producer in South America in 2003, but annual production has decreased since 2000 (table 29). The Venezuelan Government's hydrocarbons company, Petróleos de Venezuela S.A., transferred its coal business to more local interests in the Zuliana Region. In Chile, the country's largest coal mine closed in 1997, and only two small mines with dwindling reserves remained in operation at the end of 2003.

Consumption.—In 2003, Canada remained a significant international consumer of coal, primarily for power generation. Although western Canada primarily exported coal, eastern Canadian coal consumption for electricity and metallurgical purposes was satisfied mostly through imports from the United States and Colombia. The reason for this paradox was the transportation costs between western and eastern Canada. Mexico has traditionally imported relatively small quantities of metallurgical and thermal coal, mainly from the United States. In 2003, however, Mexico increased imports of thermal coal for consumption, mainly from Australia (Knight, 2004). Less than 8% of Colombia's coal production was consumed domestically, mostly by the industrial sector. In 2003, Brazil imported 13 Mt of coal for the metallurgical industry; about 30% of this coal was imported from the United States, and an additional 9.2% was supplied by Canada to Brazil.

Outlook.—Canadian levels of coal production are expected to recover somewhat by 2005, although closure of EVCC's Luscar mine is expected in 2004 owing to depletion of reserves. EVCC announced its intention to proceed with development of the Cheviot Creek Mine, however, and to begin production there by the end of 2004 with a capacity of 1.4 Mt/yr and the potential to double that capacity by the end of 2005 (Knight, 2004). In Venezuela, the new State Government owner of Carbozulia S.A. expects to recover production steadily through 2009 after adjusting to the labor effects of the national strike in the early part of 2003. In Latin America and Canada, Brazil contained the largest reserves of coal at about 930 Mt in 2003 (BP p.l.c., 2004, p. 30).

Natural Gas.—*Production.*—Latin America and Canada accounted for approximately 12% to 13% of global natural gas production in 2003, but Canada alone was responsible for more than one-half of the natural gas production in these countries. Trinidad and Tobago controlled 91% of proven natural gas reserves in the Caribbean and commissioned its third liquefied natural gas (LNG) plant in 2003. Although Argentina has been the leading producer of natural gas in Latin America since 2000, it still accounted for only about a 1.6% of global production of natural gas in 2003. Canada accounted for somewhere between a 6% and 7% share. Brazil and Bolivia have increased natural gas production significantly since 1990. Production in Venezuela had also increased dramatically since 1990, but was lower in 2003 than in 2000 owing to public unrest and labor strikes during the intervening years (tables 4, 30). Disruptions to natural gas production in Venezuela appeared to come to a close (at least temporarily) in 2003.

Consumption.—In 2003, Canada was the leading consumer in Latin America and Canada but accounted for only about 3.4% of global consumption. Argentina was the second ranked consumer of natural gas in Latin America behind Mexico (BP p.l.c., 2004, p. 25). Natural gas consumption in Brazil continued to outstrip increases in production in the country. Consequently, the country has been heavily involved in establishing an extensive network of natural gas pipelines from nearby countries in Latin America. Most of the development of natural gas production capacity in Bolivia occurred along with construction of pipelines that would enable a large proportion of Bolivia's production to be easily exported to Brazil and some to Argentina. Trinidad and Tobago was a significant supplier of LNG for consumption in the Dominican Republic, Puerto Rico, and the United States and in more distant markets, such as Spain.

Outlook.—In 2003, Venezuela contained the largest proven reserves of natural gas among the countries of Latin America and Canada; the estimated level of reserves was about 80% of the U.S. level but still far below that of Russia or some of the countries in the Middle East. Canada had the second highest quantity of reserves among the countries of Latin America and Canada with about 40% as much as in Venezuela. The next tier of Latin American countries with significant proven reserves was composed of Argentina, Bolivia, and Trinidad and Tobago (BP p.l.c, 2004, p. 20). The three Caribbean producers, Barbados, Cuba, and Trinidad and Tobago, have a combined 28.4 trillion cubic feet of proven natural gas reserves (U.S. Energy Information Administration, 2005§).

Canada is expected to continue to be the largest producer and exporter of natural gas in Latin America and Canada through 2009. Natural gas production in Trinidad and Tobago and Venezuela is expected to continue to be exported to global markets; Venezuela's production is expected to recover production levels that approach those of 2000 by 2009. Bolivia is also expected to continue to increase production substantially through 2009 (table 30). Peru's Aguaytia and Camisea gasfields are expected to enter into full production by the end of 2005, and an LNG terminal is expected to be completed soon after that. This new terminal is expected to supply LNG to Chile, Mexico, and the United States.

Petroleum.—*Production.*—Latin America and Canada produced between 17% and 18% of the world's crude petroleum in 2003. Mexico, Venezuela, and Canada had about a 5% share, a 4% share, and a 3.5% share of global production, respectively (table 4). In Ecuador, petroleum was the leading export commodity. Construction of the Oleducto de Crudos Pesados (OCP) pipeline was completed in September 2003; this pipeline removed a historical bottleneck in Ecuadorian production.

Many countries in Latin America produce some petroleum. Barbados, for instance, produced just enough petroleum to ship to Trinidad and Tobago for refining and then re-imported the refined products for it own consumption. In Cuba, the Canasi 9 and the Canasi 65 wells were drilled and brought into production. These were the only three countries in the Caribbean region that have significant oil and gas reserves. Trinidad and Tobago contained 60 percent of proven crude oil reserves in this region and was the only significant hydrocarbon producer in the Caribbean (U.S. Energy Information Administration, 2005§).

Consumption.—In 2003, Canada led petroleum consumption among the countries of Latin America and Canada with about a 2.6% share of petroleum consumption in the world. Brazil and Mexico were right behind in consuming about a 2.3% share each. Petroleum consumption in Venezuela comprised the next highest share of global consumption among the countries of Latin America and Canada; most remarkable, however, was the 11.5% decrease in 2003 for the annual consumption of petroleum (BP p.l.c., 2004, p. 9).

Petroleum was the primary energy source for many of the Caribbean countries, which imported oil from Mexico and Venezuela under favorably negotiated terms in 2003. Under the San Jose Pact, Barbados, the Dominican Republic, Haiti, and Jamaica receive oil and refined products from those two countries. Cuba received crude oil and petroleum products from Venezuela at a discounted rate in 2003, although shipments were occasionally delayed depending on market fluctuations in the Caribbean (U.S. Energy Information Administration, 2005§).

Outlook.—Venezuela controls the largest amount of petroleum reserves in Latin America and Canada; it has more than 2.6 times the proven reserves of the United States and the sixth highest level of reserves in the world. Canada and Brazil compose the next tier of countries in Latin America and Canada in terms of proven petroleum reserves. Brazil leads the tier below them (BP p.l.c., 2004, p. 4). Barbados, Cuba, and Trinidad and Tobago have a combined 1.74 billion barrels of proven crude oil reserves (U.S. Energy Information Administration, 2005§).

Total U.S. gross petroleum imports are projected to increase by about 64% from 2003 to 2025, with significant imports of petroleum from Canada and Mexico expected to continue (U.S Energy Information Administration, 2005§). Petroleum production in Latin America and Canada is expected to increase by 2005 owing mostly to increased production in Mexico and Venezuela. From 2005 through 2009, total production is expected to increase more incrementally owing mostly to continuing increases in production in Ecuador (table 31).

Uranium.—*Production.*—In 2003, the only significant production of uranium came out of Canada. Production in Canada was lower than in 2000 (table 32).

Consumption.—In 2003, the United States imported about 7,700 t (about 17 million pounds) of uranium (U_3O_8 equivalent) from Canada. In Latin America, use in Argentina and Brazil was inconsequential, internationally. Mexico, however, was a growing consumer of uranium with 2003 levels of consumption higher than that of Argentina (U.S. Energy Information Administration, 2004, p. 3).

Outlook.—Production in Canada is expected to increase by about 17% by 2005 compared with that of 2003 and then to remain flat between 2005 and 2009. Production in Brazil is expected to remain flat between 2003 and 2009 (table 32).

Trade Review

Brazil was the leading market and the economic center of MERCOSUR. The country accounted for about 71% of MERCOSUR's population and almost 66% of the trading bloc's combined GDP based on purchasing power parity. In 2003, Brazil sold about 20% of its exports to other MERCOSUR members and 30% to other countries in Latin America. Total bilateral minerals trade between the major players of MERCOSUR [Brazil ($1.1 billion) and Argentina ($700 million)] amounted to $1.8 billion. Total mineral trade between Brazil and the United States was $4.5 billion. Brazilian exports to the United States were valued at $3.4 billion, and imports from the United States were valued at $1.1 billion. Brazil's mineral trade balance with the United States was $2.6 billion. Brazilian exports to Europe and Japan consisted mostly of raw materials that were, in order of export value, iron ore, manganese, marble, and granite, and agricultural commodities.

In 2003, Brazil's Government announced that MERCOSUR had made progress in trade talks with the Andean Pact nations, Mexico, and South Africa. The expansion of MERCOSUR has been a strategic objective of Brazil in the planned talks towards the FTAA. In 2003, Brazil's second ranked trading partner after the United States was China ($6.5 billion). Brazil's wealth of natural resources and China's need for raw materials to fuel its economy appeared to be combining to lead both countries into a more formal Sino-Brazilian trade partnership in the near future.

Tariffs for most items, which included most mineral commodities, will not become completely eliminated until 2006 as a result of the FTA that has been in effect between Bolivia and MERCOSUR since March 1, 1997. Indeed, tariffs for some goods will still not become completely eliminated until 2011 or 2014, but the average reduction of tariffs in 2003 was already about 70% compared with tariff levels prior to 1997. With tariff reductions mostly accomplished by 2003, however, the benefits of freer trade with MERCOSUR were estimated to be less than the costs of apparent trade diversion (U.S. Embassy, La Paz, Bolivia, 2003§).

Chile and the United States signed a separate bilateral FTA that was ratified by each country's respective legislatures in 2003. This FTA was expected to provide greater freedom of mineral trade and, ultimately, greater efficiencies of production. Canada and Chile signed a bilateral trade pact on November 19, 1996. Since 1996, Canadian trade with Chile and FDI in Chile by Canadian-based firms have increased noticeably. In 2003, some Andean Pact countries, like Colombia and Ecuador, made a great deal of progress in FTA negotiations with the United States, but almost no progress was made to include Bolivia among them (U.S. Trade Representative, 2003§).

Cuba's principal trading partners in Europe were France, Germany, Italy, Russia, and Spain, which accounted for 47% of Cuba's total commercial exchange, followed in the Americas by Canada, the Netherlands Antilles, Mexico, and Venezuela, which accounted for 37%, and Asia, which accounted for 14% (Investment Promotion Center of the Ministry for Foreign Investment and Economic Cooperation, 2003§).

Environment

Most of the environmental laws and regulations for each country as they affect mining and mineral processing are addressed in the ensuing chapters in the Latin America and Canada Volume of the Minerals Yearbook for 2003. These chapters also include information on the most recent developments in each country. Between pairs of affected countries, there are some joint environmental policies in the Guyana Shield, the Cordillera, and the Amazon Rain Forest, which is one of the world's most sensitive ecosystems.

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TABLE 1
THE AMERICAS: AREA AND POPULATION[1]

	Area[2] (square kilometers)	Population (millions)
North America:		
Canada	9,984,670	31.6
Mexico	1,972,550	102
United States	9,631,418	291
Total	21,600,000	425
Central America and the Caribbean:		
Antigua and Barbuda	443	0.079
Aruba	193	0.097
Bahamas, The	13,940	0.317
Barbados	431	0.271
Belize	22,966	0.259
Bermuda	53	0.064
Costa Rica	51,100	4.01
Cuba	110,860	11.3
Dominica	754	0.071
Dominican Republic	48,730	8.74
El Salvador	21,040	6.53
Grenada	344	0.105
Guadeloupe	1,780	0.440
Guatemala	108,890	12.3
Haiti	27,750	8.44
Honduras	112,090	6.97
Jamaica	10,991	2.64
Martinique	1,100	0.426
Montserrat	102	0.090
Netherlands Antilles	960	0.22
Nicaragua	129,494	5.48
Panama	78,200	2.98
Saint Helena	410	0.007
Saint Kitts and Nevis	261	0.047
Saint Lucia	616	0.161
Saint Vincent and the Grenadines	389	0.109
Trinidad and Tobago	5,128	1.31
Other[3]	10,393	4.11
Total	759,000	77.6
South America:		
Argentina	2,766,890	38.4
Bolivia	1,098,580	8.98
Brazil	8,511,965	177
Chile	756,950	15.8
Colombia	1,138,910	44.4
Ecuador	283,560	13.0
French Guiana	91,000	0.187
Guyana	214,970	0.769
Paraguay	406,750	5.64
Peru	1,285,220	27.1
Suriname	163,270	0.438
Uruguay	176,220	3.38
Venezuela	912,050	25.5
Total	17,800,000	360
Americas total	40,200,000	863
World total	149,000,000.00	6,270
Share of world total	27	14

[1]Data updated as of November 16, 2004. Population and totals rounded to no more than three significant digits.
[2]Includes Anguilla, British Virgin Islands, Cayman Islands, Puerto Rico, Turks and Caicos Islands, and U.S. Virgin Islands.

Sources: U.S. Central Intelligence Agency, World Factbook 2004; World Bank, 2004 World Development Indicators database.

TABLE 2

THE AMERICAS: GROSS DOMESTIC PRODUCT[1, 2]

	GDP per capita	GDP	GDP growth rate percentage
North America:			
Canada	30,935	977.292	2.0
Mexico	9,070	929.075	1.3
United States	35,503	10,225.07	3.0
Total	XX	12,100	XX
Central America and the Caribbean:			
Antigua and Barbuda	1,668	0.79	2.5
Aruba	NA	NA	NA
Bahamas, The	17,374	5.394	1.9
Barbados	15,059	4.072	2.2
Belize	6,164	1.59	9.4
Bermuda	NA	NA	NA
Costa Rica	9,035	37.672	5.6
Cuba	NA	NA	NA
Dominica	5,683	0.376	0
Dominican Republic	6,514	56.277	-0.4
El Salvador	3,360	21.905	1.8
Grenada	6,353	0.648	2.5
Guadeloupe	NA	NA	NA
Guatemala	3,838	50.034	2.2
Haiti	1,613	13.585	0.4
Honduras	2,562	17.941	3.2
Jamaica	3,917	10.446	2.2
Martinique	NA	NA	NA
Montserrat	NA	NA	NA
Netherlands Antilles	21,644	3.802	1.4
Nicaragua	2,427	13.311	2.3
Panama	6,362	19.085	4.1
St. Kitts and Nevis	11,195	0.549	2.1
Saint Helena	NA	NA	NA
Saint Lucia	4,916	0.859	2.3
Saint Vincent and the Grenadines	6,043	0.678	2.2
Trinidad and Tobago	10,578	13.652	13.1
Other[3]	NA	NA	NA
Total	XX	273	XX
South America:			
Argentina	11,013	421.565	8.8
Bolivia	2,714	22.103	2.5
Brazil	8,015	1,390.599	-0.2
Chile	10,017	157.997	3.3
Colombia	7,095	309.329	3.7
Ecuador	3,611	49.448	2.6
French Guiana	NA	NA	NA
Guyana	3,947	3.047	-0.8
Paraguay	4,221	24.889	2.6
Peru	4,990	141.915	4.1
Suriname	5,425	2.469	5.1
Uruguay	11,513	38.917	2.5
Venezuela	4,363	110.817	-7.6
Total	XX	2,670	XX
Americas total	XX	15,000	XX
World total	XX	50,400	XX
Share of world total	XX	29.8	XX

NA Not available. XX Not applicable.

[1]Data updated as of March 1, 2005.

[2]Gross domestic product (GDP) based on purchasing power parity of billions of U.S. dollars. Totals rounded to no more than three significant digits.

[3]Includes Anguilla, British Virgin Islands, Cayman Islands, Puerto Rico, Turk and Caicos Islands, and U.S. Virgin Islands.

Source: International Monetary Fund, World Economic Outlook Database, September 2004.

TABLE 3

SELECTED SIGNIFICANT LATIN AMERICA AND CANADA EXPLORATION IN 2003[1]

Location	Type[2]	Site	Commodity	Company	Resource[3]	Exploration[4]
Argentina	F	Manantial Espejo	Ag, Au	Silver Standard Resources Inc.	37 Moz Ag, 620,000 oz Au	Extensive drilling.
Bolivia	E	San Simon	Au	Eaglecrest Exploration Ltd.	Data not released	Extension of resources.
Brazil	P	Fazenda Brasileiro	Au	Yamana Gold Inc.	262,000 oz Au	Extensive drilling.
Do.	F	Jacobina	Au	Desert Sun Mining Corp.	1.36 Moz Au	Do.
Do.	F	Onca-Puma	Ni, Co	Canico Resource Corp.	2.24 Mt Ni, 109,000 t Co	Do.
Do.	E	Sao Francisco	Au	Yamaha Resources Inc.	Data not released	Do.
Canada	E	Aviat	Diamond	Northern Empire Minerals Ltd.	Data not released	Extensive work program.
Do.	E	Black Fox	Au	Apollo Gold Corp.	Data not released	Extensive drilling.
Do.	P	Casa Berardi	Au, Cu	Aurizon Mines Ltd.	1.5 Moz Au	Do.
Do.	E	Croinor	Au	South Malartic Exploration Inc.	Data not released	Do.
Do.	E	Discovery	Au	Strateco Resources Inc.	348,000 oz Au	Do.
Do.	P	Doyon	Au	Cambior Inc.	Data not released	Do.
Do.	P	Eagle River	Au	River Gold Mines Ltd.	do.	Do.
Do.	P	Eskay Creek	Au	Barrick Gold Corp.	do.	Do.
Do.	E	Expo Ungava/Mesamax	Ni, Cu, PGM	Canadian Royalties Inc.	30,000 t Ni, 39,000 t Cu, 242,000 oz PGM	Do.
Do.	F	Fort à la Corne	Diamond	Kensington Resources Ltd.	Data not released	Do.
Do.	E	Foxtrot/Renard	Diamond	Ashton Mining of Canada Inc.	do.	Extensive work program.
Do.	E	Hope Bay	Au	Hope Bay Gold Corp.	1.68 Moz Au	Extensive drilling.
Do.	P	Joe Mann	Au	Campbell Resources Inc.	155,000 oz Au	Do.
Do.	P	Kemess North	Cu, Au	Northgate Exploration Ltd.	4 Moz Au, 647,000 t Cu	Do.
Do.	E	Kirkland Lake	Au	Queenston Mining Inc.	Data not released	Do.
Do.	P	Lac des Iles	PGM, Au	North American Palladium Ltd.	938,000 oz Pd, 56,000 oz Pt, 46,000 oz Au	Do.
Do.	P	LaRonde	Ag, Cu, Zn, Au	Agnico-Eagle Mines Ltd.	Data not released	Do.
Do.	P	Macassa	Au	Kirkland Lake Gold Ltd.	1.08 Moz Au	Do.
Do.	E	Madsen Red Lake	Au	Claude Resources Inc.	Data not released	Do.
Do.	P	McCreedy West area	Ni, Cu, PGM	Fort Knox Gold Resources Inc.	1.36 Mt Ni	Extensive work program.
Do.	F	Meadowbank	Au	Cumberland Resources Ltd	3 Moz Au	Extensive drilling.
Do.	E	Monument Bay	Au	Bema Gold Corp.	418,000 oz Au	Do.
Do.	E	Norman	Ni, Cu, PGM	Fort Knox Gold Resources Inc.	Data not released	Extensive work program.
Do.	P	Porcupine Joint Venture	Au	Kinross Gold Corp.	do.	Extensive drilling.
Do.	E	Red Chris	Cu, Au	bcMetals Corp.	371,000 t Cu, 1.1 Moz Au	Do.
Do.	P	Red Lake	Au	Goldcorp Inc.	5.1 Moz Au	Extensive work program.
Do.	E	Red Lake Joint Venture	Au	Rubicon Minerals Corp.	Data not released	Extensive drilling.
Do.	E	Regal Ridge	Emerald	True North Gems Inc.	do.	Extensive work program.
Do.	E	River Valley	PGM, Au	Pacific North West Capital Corp.	1 Moz PGM plus Au	Extensive drilling.
Do.	P	Seabee	Au	Claude Resources Inc.	Data not released	Do.
Do.	E	Windy Lake	Ni, Cu, PGM	Wallbridge Mining Co. Ltd.	do.	Do.
Chile	D	Cerro Bayo	Au, Ag	Coeur d'Alene Mines Corp.	do.	Do.
Do.	F	Refugio	Au	Bema Gold Corp.	3.4 Moz Au	Do.
Colombia	F	Angostura	Au	Greystar Resources Ltd.	Data not released	Do.
French Guiana	E	Camp Caiman	Au	Ariane Gold Corp.	976,000 oz Au	Do.

See footnotes at end of table.

TABLE 3--Continued

SELECTED SIGNIFICANT LATIN AMERICA AND CANADA EXPLORATION IN 2003[1]

Location	Type[2]	Site	Commodity	Company	Resource[3]	Exploration[4]
Mexico	F	Dolores	Au, Ag	Minefinders Corp. Ltd.	2.33 Moz Au, 116 Moz Ag	Extensive drilling.
Do.	E	Guadelupe y Calvo	Au	Mexgold Resources Inc.	1.78 Moz Au	Do.
Do.	F	Ocampo Northeast	Au, Ag	Gammon Lake Resources Inc.	1.4 Moz Au, 70 Moz Ag	Do.
Do.	E	Penasquito	Ag, Au, Pb, Zn	Western Copper Holdings Ltd.	159 Moz Ag, 1.36 Moz Au	Do.
Peru	F	Alto Chicama	Au	Barrick Gold Corp.	7.3 Moz Au	Do.
Do.	P	Marcapunta	Cu, Au, As	Compańia de Minas Buenaventura	Data not released	Do.
Do.	P	Yanacocha area	Au	Newmont Mining Corp.	do.	Extensive work program.
Venezuela	F	Block B	Au	Hecla Mining Co.	do.	Extensive drilling
Do.	F	Choco	Au	Bolivar Gold Corp.	1.05 Moz Au	Do.

[1]Abbreviations used in this table for commodities are as follows: Ag, silver; As, arsenic; Au, gold; Co, cobalt; Cu, copper; Ni, nickel; Pb, lead; Pd, palladium; PGM, platinum-group metals; Pt, platinum; and Zn, zinc. Abbreviations used in this table for units of measurement are as follows: Moz, million troy ounces; Mt, million metric tons; oz, troy ounces; t, metric tons.

[2]D Approved for development; E Active exploration; F Feasibility work ongoing/completed; P Exploration at producing site.

[3]Based on 2003 data reported from various sources, values vary from measured reserves to identified resources. Data not verified by U.S. Geological Survey.

[4]Significance of activity defined by either quantity of drilling or investment expenditure.

TABLE 4

LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED MINERAL COMMODITIES IN 2003[1]

(Thousand metric tons unless otherwise specified)

	Metals									
	Aluminum		Copper, mine	Gold, mine output,	Iron and steel		Lead, mine output,	Nickel, mine	Silver,	Tin, mine output,
Country	Bauxite	Metal, primary	output, Cu content	Au content (kilograms)	Iron ore, Fe content	Steel, crude	Pb content (metric tons)	output, Ni content	Ag content (metric tons)	Sn content (metric tons)
Argentina	--	272	199	29,744	--	5,033	12,079	--	134	--
Bolivia	--	--	(2)	9,362	--	--	9,740	--	465	16,755
Brazil	13,148	1,381	27	44,400 [e]	155,693	29,600	10,652	31	35	12,000 [e]
Chile	--	--	4,904	38,954	4,500	1,377	1,697	--	1,313	--
Colombia	--	--	2	46,515	344	668	(2) [e]	71	10	--
Costa Rica	--	--	--	110 [e]	--	--	--	--	(2) [e]	--
Cuba	--	--	-- [e]	547 [e]	--	268	--	74	--	--
Dominican Republic	--	--	--	--	--	61	--	45	--	--
Ecuador	--	--	(2) [e]	3,020	--	80 [e]	(2)	--	(2) [e]	--
El Salvador	--	3	--	--	--	--	--	--	--	--
Guatemala	--	--	--	4,550 [e]	15 [e]	--	--	--	--	--
Guyana	1,701	--	--	12,170	--	--	--	--	--	--
Honduras	--	--	--	5,000 [e]	--	--	8,000 [e]	--	48 [e]	--
Jamaica	13,444	--	--	277	--	--	--	--	(2)	--
Mexico	--	--	356	20,406	6,759	15,178	139,348	--	2,569	2
Nicaragua	--	--	--	3,029	--	--	--	--	2	--
Panama	--	--	--	--	--	--	--	--	--	--
Paraguay	--	--	--	--	--	80	--	--	--	--
Peru[p]	--	--	843	172,619	3,541	750	308,874	--	2,921	40,202
Suriname	4,215	--	--	300 [e]	--	--	--	--	--	--
Trinidad and Tobago	--	--	--	--	--	923	--	--	--	--
Uruguay	--	--	--	1,730	6 [e]	34 [e]	--	--	--	--
Venezuela	5,446	601	--	8,190	11,936	3,930	--	21 [e]	--	--
Other[3]	--	--	--	3,001	--	--	--	--	--	--
Total	38,000	2,260	6,330	401,000	183,000	58,000	491,000	242	7,500	69,000
Share of world total	25.9%	7.9%	46.3%	15.5%	28.4%	6.2%	15.1%	18.2%	36.7%	26.6%
Canada[p]	--	2,792	534	140,559	20,993	16,300	81,268	163	1,309	--
Share of world total	--	9.8%	3.9%	5.4%	3.3%	1.7%	2.5%	12.2%	6.4%	--
United States	NA	2,700	1,120	277,000	29,300	93,700	460,000	--	1,240	--
Share of world total	NA	9.5%	8.2%	10.7%	4.5%	10.0%	14.1%	--	6.1%	--
Total Western Hemisphere	38,000	7,750	7,980	818,000	233,000	168,000	1,030,000	405	10,000	69,000
Share of world total	25.9%	27.2%	58.4%	31.7%	36.2%	18.0%	31.7%	30.4%	49.2%	26.6%
World total	147,000	28,500	13,700	2,580,000	644,000	932,000	3,260,000	1,330	20,400	259,000

See footnotes at end of table.

TABLE 4--Continued

LATIN AMERICA AND CANADA: PRODUCTION OF SELECTED COMMODITIES IN 2003[1]

(Thousand metric tons unless otherwise specified)

	Metals--Continued	Industrial minerals				Mineral fuels and related products				
							Natural gas		Petroleum	
Country	Zinc, mine output, Zn content (metric tons)	Cement, hydraulic	Gypsum	Phosphate rock, P_2O_5 content	Salt	Coal, all grades	Marketed/dry (million cubic meters)[4]	Plant liquids (thousand 42-gallon barrels)	Crude, incl. condensate (thousand 42-gallon barrels)	Refinery products (thousand 42-gallon barrels)
Argentina	29,839	5,217	388	--	1,156	--	41,119	18,000 [e]	270,349	190,666
Bolivia	144,985	1,138 [p]	--	--	2	--	7,398 [p]	--	12,223 [p]	8,524 [p]
Brazil	136,000 [e]	38,000 [e]	1,630 [e]	1,700 [e]	6,110 [e]	6,000 [e]	12,490	5,865	620,865	623,785
Chile	33,051	3,600 [e]	662	3	6,213	359	1,700	3,500 [e]	1,319	77,413
Colombia	40 [e]	7,300	560 [e]	8	447	49,318	5,975	2,600 [e]	197,586	105,499
Costa Rica	--	1,300 [e]	--	--	37 [e]	--	--	--	--	5,450 [e]
Cuba	--	1,700	130 [e]	--	180 [e]	--	585	--	20,294	60,000 [e]
Dominican Republic	--	2,907	231	--	107	--	--	--	--	11,300 [e]
Ecuador	100 [e]	3,100	5 [e]	--	90 [e]	--	103	514	152,497	50,111
El Salvador	--	1 [e]	6 [e]	--	31 [e]	--	--	--	--	6,300 [e]
Guatemala	--	1,900 [e]	67	--	60 [e]	--	1 [e]	--	9,028	7,550 [e]
Guyana	--	--	--	--	--	--	--	--	--	--
Honduras	46,500 [e]	1,400 [e]	60 [e]	--	26 [e]	--	--	--	--	--
Jamaica	--	608	249	--	19 [e]	--	--	--	--	3,600 [e]
Mexico	413,991	32,000	6,986	2	7,547	11,305	31,000	--	1,382,985	471,215
Nicaragua	--	590 [e]	31	--	31	--	--	--	--	5,700 [e]
Panama	--	770 [e]	--	--	23 [e]	--	--	--	--	--
Paraguay	--	660 [e]	4 [e]	--	--	--	--	--	--	2,660 [e]
Peru[p]	1,372,790	4,000	71	12	187	62 [e]	357	318	33,343	64,171
Suriname	--	65	--	--	--	--	--	--	4,300	2,600 [e]
Trinidad and Tobago	--	766	--	--	--	--	26,046	10,500	48,947	54,093
Uruguay	--	1,050 [e]	1,130 [e]	--	--	--	--	--	--	11,200 [e]
Venezuela	--	7,000	-- [e]	75	350 [e]	7,034	26,060	66,500	964,695	370,000
Other[3]	--	1,133	--	--	1,649	--	16	--	365	185,175
Total	2,180,000	116,000	12,200	1,800	24,300	74,100	153,000	108,000	3,720,000	2,320,000
Share of world total	23.2%	5.9%	11.1%	4.2%	11.1%	1.5%	5.8%	7.7%	13.9%	8.7%
Canada[p]	788,328	14,063	8,330	380	13,390	62,163	164,834	68,800	907,018	513,000
Share of world total	8.4%	0.7%	7.6%	0.9%	6.1%	1.3%	6.3%	4.9%	3.4%	1.9%
United States	738,000	94,300	16,700	10,600	43,700	972,000	567,000	NA	2,070,000	6,380,000
Share of world total	7.9%	4.8%	15.2%	24.7%	20.0%	19.6%	21.6%	NA	7.7%	24.0%
Total Western Hemisphere	3,700,000	225,000	37,200	12,800	81,400	1,110,000	885,000	177,000	6,700,000	9,210,000
Share of world total	39.4%	11.4%	34.0%	29.8%	37.2%	22.4%	33.8%	12.7%	25.0%	34.6%
World total	9,400,000	1,970,000	110,000	42,900	219,000	4,960,000	2,620,000	1,390,000	26,800,000	26,600,000

[e]Estimated; estimated data, U.S. data, and world totals are rounded to no more than three significant digits. [p]Preliminary. NA Not available. -- Zero or zero percent.

[1]Totals may not add due to independent rounding. Percentages are calculated on unrounded data. Table includes data available as of April 2005.

[2]Less than 1/2 unit.

[3]Includes Aruba, Barbados, Belize, French Guiana, Guadeloupe, Haiti, Martinique, and the Netherlands Antilles.

[4]Data not found in country tables are based on the following source: Energy Information Administration, International Energy Annual 2002, World Natural Gas Production 2 Table 4.1, accessed at URL http://www.eia.doe.gov/pub/international/iea2002/table41.xls

TABLE 5
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED BAUXITE PRODUCTION, 1990-2009[1]

(Thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Brazil	9,680	10,200	13,800	13,100	15,000	19,500	19,600
Guyana	1,420	2,020	2,470	1,700	1,500	1,500	1,500
Jamaica	10,900	10,900	11,100	13,400	14,500	15,600	16,600
Suriname	3,280	3,530	3,610	4,220	4,500	4,500	4,500
Venezuela	771	5,020	4,360	5,450	5,500	5,500	6,000
Other	85	--	--	--	--	--	--
Total	26,100	31,700	35,300	37,900	41,000	46,600	48,000

[e]Estimated. --Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 6

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PRIMARY ALUMINUM PRODUCTION, 1990-2009[1]

(Thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	166	186	262	272	275	275	275
Brazil	931	1,180	1,280	1,380	1,470	1,510	1,510
Canada	1,570	2,170	2,370	2,790	3,000	3,000	3,000
Mexico	68	10	61	--	--	--	--
Suriname	32	28	--	--	--	--	--
Venezuela	590	630	571	601	620	630	840
Total	3,360	4,200	4,540	5,040	5,400	5,400	5,600

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 7

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED SECONDARY ALUMINUM PRODUCTION, 1990-2009[1]

(Thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	6	10	16	16	16	16	16
Brazil	60	92	210	254	250	250	250
Canada	83	NA	148	180	200	200	200
Mexico	60	129	287	300	300	300	300
Total	209	231	661	750	770	770	770

[e]Estimated. NA Not available.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 8

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED COPPER MINE PRODUCTION, 1990-2009[1]

(Metal content in thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	--	--	145	199	200	200	200
Brazil	36	49	32	27	170	175	175
Canada	794	726	634	534	630	650	670
Chile	1,590	2,490	4,600	4,900	5,540	5,900	6,300
Mexico	294	335	365	356	400	440	440
Peru	318	444	554	843	1,050	1,100	1,200
Other	--	2	3	2	2	2	2
Total	3,030	4,050	6,330	6,860	8,000	8,500	9,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 9
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED REFINED COPPER PRODUCTION, 1990-2009[1]

(Thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina[2]	11	16	16	16	16	16	16
Brazil	199	219	233	197	275	300	300
Canada	516	614	613	482	625	675	675
Chile[3]	1,190	1,490	2,670	2,900	3,170	3,350	3,500
Mexico	153	212	411	355	420	420	420
Peru[3]	318	444	452	517	570	600	600
Total	2,390	3,000	4,400	4,470	5,080	5,360	5,510

[e]Estimated.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Secondary only.

[3]Primary only.

TABLE 10

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED GOLD MINE PRODUCTION, 1990-2009[1]

(Metal content in kilograms)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	1,200	837	26,000	29,700	45,000	50,000	50,000
Belize	1	5	7	1	1	1	1
Bolivia	5,200	14,400	12,000	9,400	8,000	7,000	6,000
Brazil	102,000	63,300	50,400	44,400	54,900	63,600	63,600
Canada	169,000	152,000	156,200	141,000	171,000	187,000	187,000
Chile	27,500	44,600	54,100	39,000	39,000	41,000	43,000
Colombia	29,400	21,100	37,000	46,500	40,000	40,000	40,000
Costa Rica	460	400	50	110	1,000	2,000	5,000
Cuba	--	184	1,000	547	600	600	600
Dominican Republic	4,350	3,280	--	--	--	--	--
Ecuador	10,100	7,410	2,870	3,020	4,000	4,500	5,000
French Guiana	870	3,000	3,470	3,000	3,300	6,000	6,000
Guatemala	62	30	4,500	4,550	800	7,000	10,000
Guyana[2]	1,500	9,010	13,500	12,200	4,000	4,000	4,000
Honduras	156	111	878	5,000	10,000	16,000	17,000
Jamaica	--	--	--	277	300	300	300
Mexico	9,680	20,300	26,400	20,400	25,000	25,000	25,000
Nicaragua	1,200	1,320	3,670	3,030	3,900	4,500	6,000
Panama	85	1,100	--	--	600	1,200	1,300
Peru	10,400	56,000	139,000	173,000	173,000	175,000	175,000
Suriname	30	300	300	300	300	300	300
Uruguay	--	900	2,180	1,730	2,200	2,300	2,300
Venezuela	7,700	7,260	7,330	8,190	13,000	15,000	20,000
Total	381,000	407,000	541,000	545,000	600,000	652,000	667,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Refined.

TABLE 11
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED IRON ORE PRODUCTION, 1990-2009[1]

(Iron content in thousand metric tons)

Country	Iron content	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	68%	680	--	--	--	--	--	--
Bolivia	65%	80	--	--	--	--	--	--
Brazil	66%	100,000	113,000	141,000	156,000	160,000	160,000	160,000
Canada	64%	22,000	24,600	22,700	21,000	21,000	21,000	21,000
Chile	62%	5,040	5,200	5,460	4,500	4,400	4,300	4,200
Colombia	55%	283	300	363	344	350	350	350
Cuba	NA	--	--	--	(2)	(2)	(2)	(2)
Guatemala	65%	4	1	10	15	14	13	12
Mexico	60%	7,110	5,630	6,800	6,760	7,000	7,000	7,000
Peru	68%	2,150	3,950	2,810	3,540	4,200	4,500	4,500
Uruguay	65%	3	3	4	6	6	6	6
Venezuela	65%	13,100	12,600	11,100	11,900	15,000	16,000	20,000
Total	XX	150,000	165,000	190,000	204,000	210,000	210,000	220,000

[e]Estimated. -- Negligible or no production. NA Not available. XX Not applicable.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Less than 1/2 unit.

TABLE 12

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PIG IRON AND DIRECT-REDUCED IRON PRODUCTION, 1990-2009[1]

(Thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina:							
Pig iron	1,930	1,570	2,190	2,400	2,500	2,500	2,500
Direct-reduced iron	1,040	1,330	1,420	1,740	2,000	2,000	2,000
Brazil:							
Pig iron	21,100	25,100	28,000	32,500	32,500	32,500	32,500
Direct-reduced iron	260	288	418	410	410	410	410
Canada:							
Pig iron	7,350	8,460	8,900	8,800	9,000	9,000	9,000
Direct-reduced iron	730	1,010	920	920	920	920	920
Chile	675	855	1,020	988	1,000	1,100	1,200
Colombia	323	282	272	283	300	300	300
Mexico:							
Pig iron	3,670	4,140	4,860	4,180	4,200	4,500	4,500
Direct-reduced iron	2,530	3,700	5,590	5,470	5,500	5,600	5,600
Paraguay	61	103	63	88	88	88	88
Peru:							
Pig iron	93	247	327	330	330	330	330
Direct-reduced iron	29	3	80	80	80	80	80
Trinidad and Tobago[2]	697	1,040	1,530	2,280	2,300	2,300	2,300
Venezuela							
Pig iron	314	--	--	--	--	--	--
Direct-reduced iron	3,130	5,100	6,400	6,650	7,000	7,000	7,000
Total	43,900	53,200	62,000	67,100	68,000	69,000	69,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Direct-reduced iron.

TABLE 13
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED CRUDE STEEL PRODUCTION, 1990-2009[1]

(Thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	3,640	3,620	4,470	5,030	5,100	5,100	5,100
Brazil	20,600	25,100	27,900	29,600	33,000	33,000	33,000
Canada	12,300	14,400	15,900	16,300	17,000	17,000	17,000
Chile	800	1,010	1,350	1,380	1,600	1,600	1,600
Colombia	703	792	660	668	750	750	750
Cuba	270	207	327	268	300	300	300
Dominican Republic	36	--	36	61	61	61	61
Ecuador	20	35	58	80	80	80	80
Jamaica	24	25	--	--	--	--	--
Mexico	8,710	12,100	15,600	15,200	17,000	17,200	17,500
Paraguay	48	96	77	80	80	80	80
Peru[2]	284	515	749	750	750	750	750
Trinidad and Tobago	631	738	753	923	1,000	1,000	1,000
Uruguay	38	40	38	34	50	50	50
Venezuela	2,680	3,630	3,840	3,930	4,000	4,000	4,000
Total	50,800	62,300	71,800	74,300	81,000	81,000	81,000

[e]Estimated. -- Negligible or no production.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Ingots and castings.

TABLE 14

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED LEAD MINE PRODUCTION, 1990-2009[1, 2]

(Metal content in metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	23,400	10,500	14,100	12,100	12,000	12,000	12,000
Bolivia	19,900	20,400	9,520	9,740	10,000	10,500	11,000
Brazil	9,300	11,600	8,830	10,700	13,000	13,000	13,000
Canada	241,000	211,000	149,000	81,300	77,000	80,000	90,000
Chile	1,120	944	785	1,700	1,600	1,500	1,400
Colombia	331	300	226	220	250	250	250
Ecuador	200	200	200	220	100	50	50
Honduras	5,790	2,620	4,810	8,000	8,500	9,500	10,000
Mexico	187,000	164,000	138,000	139,000	143,000	145,000	150,000
Peru	188,000	238,000	271,000	309,000	310,000	310,000	310,000
Total	676,000	660,000	596,000	572,000	580,000	580,000	600,000

[e]Estimated.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 15
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PRIMARY REFINED LEAD PRODUCTION, 1990-2009[1]

(Metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	5,500	2,430	8,700	11,000	11,500	12,000	12,000
Brazil	30,200	14,000	--	--	--	--	--
Canada	87,200	178,000	159,000	112,000	130,000	130,000	130,000
Mexico	167,000	166,000	143,000	135,000	155,000	160,000	160,000
Peru	69,300	221,000	116,000	112,000	115,000	115,000	115,000
Total	359,000	581,000	427,000	370,000	412,000	420,000	420,000

[e]Estimated. -- Negligible or no production.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 16

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED SECONDARY REFINED LEAD PRODUCTION, 1990-2009[1]

(Metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	14,600	26,300	27,000	30,300	33,000	35,000	35,000
Brazil	45,300	65,000	50,000	50,000	50,000	50,000	50,000
Canada	96,500	103,000	125,000	111,000	110,000	110,000	110,000
Colombia	3,500	8,000	12,000	12,000	15,000	15,000	15,000
Mexico	65,000	10,000	110,000	110,000	110,000	110,000	110,000
Venezuela	14,000	16,000	30,000	30,000	30,000	30,000	30,000
Total	239,000	228,000	354,000	343,000	350,000	350,000	350,000

[e]Estimated.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 17
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED NICKEL MINE PRODUCTION, 1990-2009[1]

(Metal content in metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Brazil	22,800	29,100	45,300	31,100	45,000	45,000	45,000
Canada	196,000	182,000	191,000	163,000	182,000	190,000	190,000
Colombia	22,400	24,200	59,000	70,800	70,000	70,000	70,000
Cuba	30,400	41,000	68,100	74,000	87,900	102,000	116,000
Dominican Republic	28,700 [2]	46,500	39,900	45,400	45,500	45,500	45,500
Venezuela	--	--	2,540	20,700	22,000	22,000	22,000
Total	300,000	323,000	406,000	405,000	450,000	470,000	490,000

[e]Estimated. -- Negligible or no production.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Nickel content of ferronickel.

TABLE 18

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PLATINUM MINE PRODUCTION, 1990-2009[1]

(Metal content in kilograms)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Brazil	--	--	--	--	--	1,000	1,000
Canada	5,000	7,000	5,700	6,500	9,200	9,200	9,200
Colombia	1,600	973	339	700	700	700	700
Total	6,600	7,970	6,040	7,200	9,900	11,000	11,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 19
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PALLADIUM MINE PRODUCTION, 1990-2009[1]

(Metal content in kilograms)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Brazil	--	--	--	--	20	20	20
Canada	6,200	8,900	10,400	12,000	17,200	17,200	17,200
Total	6,200	8,900	10,400	12,000	17,000	17,000	17,000

[e]Estimated. -- Negligible or no production.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 20
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED SILVER MINE PRODUCTION, 1990-2009[1]

(Metal content in kilograms)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	82,700	47,800	78,300	134,000	150,000	150,000	150,000
Bolivia	311,000	425,000	434,000	465,000	470,000	1,000,000	1,500,000
Brazil	171,000	49,800	41,000	35,000	35,000	35,000	35,000
Canada	1,500,000	1,290,000	1,210,000	1,310,000	1,330,000	1,340,000	1,340,000
Chile	665,000	1,040,000	1,240,000	1,313,000	1,400,000	1,500,000	1,500,000
Colombia	6,590	5,900	7,970	9,510	10,000	10,000	10,000
Costa Rica			100	110	110	110	110
Dominican Republic	21,600	21,100	--	--	--	--	--
Ecuador	60	--	2,000	100	100	100	500
Honduras	31,100	34,700	32,000	48,000	50,000	55,000	60,000
Jamaica	--	--	--	98	--	--	--
Mexico	2,420,000	2,320,000	2,620,000	2,570,000	2,700,000	2,800,000	2,900,000
Nicaragua	1,100	2,400	1,590	2,040	2,100	2,200	2,300
Panama	41	175	--	--	--	--	100
Peru	1,760,000 r	1,930,000	2,440,000	2,920,000	3,060,000	3,060,000	3,060,000
Total	6,970,000 r	7,170,000	8,110,000	8,800,000	9,200,000	10,000,000	11,000,000

[e]Estimated. -- Negligible or no production.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 21
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN MINE PRODUCTION, 1990-2009[1]

(Metal content in metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	123	--	--	--	--	--	--
Bolivia	17,300	14,000	12,500	16,800	17,000	17,300	17,500
Brazil	37,600	17,300	14,200	12,000	12,000	12,000	12,000
Canada	2,830	--	--	--	--	--	--
Mexico	5	1	4	2	2	2	2
Peru	5,130	22,300	70,900	40,200	41,600	41,700	41,700
Total	63,000	53,600	97,600	69,000	71,000	71,000	71,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 22
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TIN METAL PRODUCTION, 1990-2009[1]

(Metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	180	100	--	--	--	--	--
Bolivia	12,600	17,800	9,350	11,000	11,200	11,500	11,500
Brazil	37,600	17,000	13,800	11,500	12,000	12,000	12,000
Canada	200	--	--	--	--	--	--
Mexico	5,000	415	1,200	1,770	1,800	1,800	1,800
Peru	4,910	--	37,400	39,200	39,200	39,200	39,200
Total	60,500	35,300	61,800	63,500	64,000	65,000	65,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 23

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED ILMENITE MINE PRODUCTION, 1990-2009[1]

(TiO_2 content in metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Brazil	14,100	102,000	123,000	174,000	175,000	175,000	175,000
Canada	760,000	815,000	950,000	1,100,000	1,100,000	1,100,000	1,100,000
Total	774,000	917,000	1,070,000	1,270,000	1,300,000	1,300,000	1,300,000

[e]Estimated.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 24
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED TUNGSTEN METAL PRODUCTION, 1990-2009[1]

(Metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	6	--	--	--	--	--	--
Bolivia	1,010	655	496	556	560	550	550
Brazil	316	171	18	24	24	24	24
Canada	--	--	--	3,000	1,000	3,000	3,000
Mexico	183	287	--	--	--	--	--
Peru	1,540	728	--	--	--	--	--
Total	3,060	1,840	514	3,580	1,600	3,600	3,600

[e]Estimated. -- Negligible or no production.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 25

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED ZINC MINE PRODUCTION, 1990-2009[1]

(Metal content in metric tons)

Country	1990	1995	2,000	2003	2005[e]	2007[e]	2009[e]
Argentina	38,700	32,100	34,900	29,800	30,000	33,000	33,000
Bolivia	104,000	146,000	149,000	145,000	145,000	200,000	250,000
Brazil	158,000	189,000	100,000	136,000	250,000	300,000	300,000
Canada	1,200,000	1,120,000	1,000,000	788,000	1,000,000	1,000,000	1,000,000
Chile	25,100	35,400	31,400	33,100	33,000	33,000	33,000
Colombia	356	--	40	40	40	40	40
Ecuador	100	100	100	100	50	50	50
Honduras	29,600	27,100	31,200	46,500	46,500	46,700	47,000
Mexico	307,000	364,000	393,000	414,000	420,000	430,000	450,000
Peru	598,000	692,000	910,000	1,370,000	1,400,000	1,550,000	1,600,000
Total	2,460,000	2,610,000	2,650,000	2,960,000	3,300,000	3,600,000	3,700,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 26
LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED ZINC METAL PRODUCTION, 1990-2009[1]

(Metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	31,500	35,800	39,300	42,400	43,000	43,000	45,000
Brazil	154,000	206,000	199,000	257,000	475,000	570,000	570,000
Canada	592,000	720,000	780,000	761,000	700,000	700,000	700,000
Mexico[2]	199,000	223,000	235,000	320,000	325,000	330,000	330,000
Peru[2]	121,000	159,000	200,000	202,000	250,000	280,000	280,000
Total	1,100,000	1,340,000	1,450,000	1,580,000	1,800,000	1,900,000	1,900,000

[e]Estimated.
[1]Data are rounded to no more than three significant digits; may not add to totals shown.
[2]Primary only.

TABLE 27

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED DIAMOND MINE PRODUCTION, 1990-2009[1]

(Thousand carats)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Brazil	1,540	1,280	1,600	1,100	1,300	1,300	1,300
Canada	--	--	2,530	11,200	12,600	13,000	14,500
Guyana	18	52	82	413	420	420	420
Venezuela	333	296	110	100	100	100	100
Total	1,890	1,630	4,320	12,800	14,000	15,000	16,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 28

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PHOSPHATE ROCK PRODUCTION, 1990-2009[1]

(P_2O_5 content in thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Brazil	625	1,360	1,690	1,700	2,000	2,000	2,000
Canada[2]	NA	NA	NA	380	380	380	380
Chile	4	3	4	3	3	3	3
Colombia	10	10	8	8	10	10	10
Mexico	187	187	316	2	--	--	--
Peru	47	89	6	12	12	12	12
Venezuela	34	23	105	75	75	75	75
Total	907	1,670	2,130	2,180	2,500	2,500	2,500

[e]Estimated. NA Not available. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Sources: Natural Resources Canada and U.S. Geological Survey Minerals Yearbook, Volume I.

TABLE 29

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED MARKETABLE COAL PRODUCTION, 1990-2009[1]

(Thousand metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	270	305	246	--	--	--	--
Brazil	4,170	2,780	6,000	6,000	6,000	6,000	6,000
Canada[2]	68,300	75,000	69,200	62,200	66,000	66,000	66,000
Chile	2,730	1,490	509	359	300	250	200
Colombia	20,400	26,000	38,100	49,300	55,000	57,000	60,000
Mexico[2]	10,000	11,200	14,300	11,300	12,000	12,000	12,000
Peru[2]	175	80	62	62	62	62	62
Venezuela	2,190	4,260	7,910	7,030	8,200	8,300	8,500
Total	108,000	121,000	136,000	136,000	150,000	150,000	150,000

[e]Estimated. --Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Run of mine.

TABLE 30

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED DRY NATURAL GAS PRODUCTION, 1990-2009[1]

(Million cubic meters)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	18,100	27,000	37,400	41,100	40,000	45,000	46,000
Barbados	15	15	15	14	15	15	15
Bolivia	2,200	3,360	3,600	7,400	8,000	10,000	12,000
Brazil	6,500	6,700	9,500	19,300	19,500	19,500	19,500
Canada	98,800	148,000	166,000	165,000	165,000	165,000	165,000
Chile	2,120	1,860	1,900	1,700	1,600	1,500	1,300
Colombia	5,600	7,700	6,000	5,980	6,200	6,300	6,300
Cuba	4	4	574	585	600	600	600
Ecuador	100	119	156	103	100	100	100
Guatemala	1,000	1,250	1	1	1	1	1
Mexico	34,100	30,000	28,800	31,000	37,000	43,000	45,000
Peru	280	267	277	357	360	360	360
Trinidad and Tobago	3,750	6,120	14,200	26,000	26,100	26,100	26,100
Venezuela	15,600	32,100	36,600	26,100	30,000	32,000	35,000
Total	188,000	264,000	305,000	325,000	330,000	350,000	360,000

[e]Estimated.

[1]Dry or marketed gas. Data are rounded to no more than three significant digits; may not add to totals shown.

TABLE 31

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED PETROLEUM AND CONDENSATE PRODUCTION, 1990-2009[1]

(Thousand 42-gallon barrels)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	176,000	261,000	282,000	270,000	280,000	280,000	280,000
Barbados	454	475	560	391	400	400	400
Bolivia	7,640	10,200	10,100	12,200	12,500	13,000	14,000
Brazil	238,000	252,000	464,000	621,000	621,000	621,000	621,000
Canada[2]	567,000	662,000	804,000	907,000	946,000	946,000	946,000
Chile	7,160	4,020	2,050	1,319	1,000	800	500
Colombia	160,000	213,000	251,000	198,000	210,000	220,000	230,000
Cuba	4,980	10,200	17,400	20,300	21,000	21,000	21,000
Ecuador	104,000	143,000	146,000	152,000	180,000	210,000	250,000
Guatemala	1,440	8,420	7,570	9,030	9,050	9,050	9,050
Mexico	932,000	1,120,000	1,260,000	1,380,000	1,500,000	1,600,000	1,600,000
Peru	47,100	44,400	36,300	33,300	33,300	35,000	35,000
Suriname	--	1,500	4,500	4,300	4,300	4,300	4,300
Trinidad and Tobago	56,000	51,800	43,600	48,900	48,950	48,950	48,950
Venezuela	770,000	1,020,000	1,150,000	965,000	1,150,000	1,200,000	1,200,000
Total	3,070,000	3,800,000	4,480,000	4,620,000	5,000,000	5,200,000	5,300,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Includes synthetic crude.

TABLE 32

LATIN AMERICA AND CANADA: HISTORIC AND PROJECTED URANIUM PRODUCTION, 1990-2009[1]

(Metal content in metric tons)

Country	1990	1995	2000	2003	2005[e]	2007[e]	2009[e]
Argentina	1	58	--	--	--	--	--
Brazil	--	--	20 [2]	20	20	20	20
Canada	8,730	10,500	10,700	9,900	11,600	11,600	11,600
Total	8,730	10,600	10,700	9,900	12,000	12,000	12,000

[e]Estimated. -- Negligible or no production.

[1]Data are rounded to no more than three significant digits; may not add to totals shown.

[2]Anuário Mineral Brasileiro 2001.